

Established
80
YEARS
1935

FREE PLAN: DEPRON CAPACITOR CUB



FREE FLIGHT • CONTROL LINE • RADIO-ASSISTED

AERO MODELLER

www.aeromodeller.com
February 2016
No. 945. £5.00



THE EAGLE HAS LANDED

PLAN FEATURE – GOLDEN EAGLE III

ENGINE REPAIRS



HOW TO

NEW PISTON

EJ 'EDDIE' RIDING



ENTHUSIAST & DESIGNER

SHRUNKEN CLASSIC



REVIEW

BMP MINI TIGER



● SALISBURY FF WORLD CUP ● CHAMPIONS CL AEROBATICS ● JETEX ● ROCKETS...

OVER 750 PLANS FROM THE WORLD'S TOP DESIGNERS

THE PLANS LIST

Free Flight Scale Models



Fokker E.III (Rubber power)

A British National Championships winner, this 1/8th true-scale replica of the famous German WW.1 fighter aircraft features authentic airframe structure. It flies with scale dihedral and has a wingspan of 44.5" (1131mm). First Appeared in: FSM - Sep 2003

Plan: £12.50

Cut Parts: N/A

PLAN230



S.E.5a

Doug McHard's 1:12th scale free flight scale model with a wingspan of 27" Published in FSM November 2002 issue 36 2 sheet plan

Plan: £14.95

Cut Parts: N/A

PLAN421

Free Flight Contest Models



Dixielander

Power F/F duration for sports or SLOP competition. 50" wingspan Originally appeared in Model Flyer Magazine Issue: Nov-00 Designer: G Fuller Power: SLOP

Plan: £7.95

Cut Parts: N/A

PLANMF34



Thirty Something

P30 Class contest rubber-powered model that also offers fine performance for sport free flight. Has a novel dethermaliser system. First Appeared in: Aviation Modeller International - May 1998.

Plan: £10.00

Cut Parts: N/A

PLAN201

Control Line



Grumman Guardian

C/L Carrier Deck, Class 1 for .40 size 2-strokes .44" wingspan. Originally appeared in Model Flyer Magazine Issue: Aug-01 Designer: J Marsh Power: .40 Class 1

Plan: £9.95

Cut Parts: N/A

PLANMF59



Midget Mustang

Ian Peacock brings the classic 1948 Dave Long design up to date for the control line clubman sport stunt enthusiast, 38".

Plan: £9.95

Cut Parts: N/A

PLAN449



Liquidator

Frank Dowling's 34.75" model from 1969 updated by Richard Evans for today's vintage combat published in AeroModeller 921 (ADH003)

Plan: £9.95

Cut Parts: N/A

PLAN465

Just a small selection of the orderable plans in the ADH Publishing archives that have appeared in AMI (Aviation Modeller International), Model Flyer, Flying Scale Models, and of course this century's AeroModeller. For the full list of plans and a downloadable catalogue go to www.adhpublishing.com/shop. Some plans (but not those featured here) also have laser cut parts available.

Free Flight Sport



Leprechaun 2

A true vintage 1949 design eligible for SAM events, this 67" (1702mm) wingspan design is the middle size of three versions created by Dick Twomey. For free flight fun. First Appeared in: AMI- June 1999.

Plan: £12.50

Cut Parts: N/A

PLAN105



Mercury 3

96" (2438mm) of sheer elegance for free flight or R/C assist and engines of .60-.90 cu.in. Rudder and elevator control surfaces shown. A real beauty! First Appeared in: Aviation Modeller International - October 1996.

Plan: £20.00

Cut Parts: N/A

PLAN116



Twelf

A 38.5" (978mm) span vintage style biplane for free flight, using engines in the 0.5-1cc range. Attractive lines and stable performance. First Appeared in: Aviation Modeller International - November 1998.

Plan: £10.00

Cut Parts: N/A

PLAN202

A SECTION FOR EVERY MODELLER

- CLIFF CHARLESWORTH SERIES
- PETER RAKE SERIES
- CONTROL LINE
- De HAVILLAND RC CLASSICS
- FREE FLIGHT CONTEST MODELS
- FREE FLIGHT SPORT
- RC GLIDERS & SAILPLANES
- RC SCALE ELECTRIC
- RC SCALE GLIDERS
- RC SCALE POWER
- RC SPORT ELECTRIC
- RC SPORT IC POWER
- RC WATERPLANES
- FREE FLIGHT VINTAGE
- FREE FLIGHT SCALE MODELS
- RC SCALE IC ELECTRIC
- RC SPORTS
- FREE FLIGHT SCALE
- FREE FLIGHT EBENEZER
- INDOOR RC FREE FLIGHT

Plans Postage: UK £2.50, Europe £4.00, World £6.00.

Order online www.adhpublishing.com/shop or by phone on +44(0) 1525 222573 using a credit card, or by cheque payable to 'ADH Publishing Ltd' sent to ADH Publishing, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire LU6 1QX

CONTENTS

AEROMODELLER 945 February 2016 – Next issue published on 18th February 2016

04 **Heard at the Hangar Doors**
Editorial, News and Views

07 **Up and Coming**
Calendar of Events for the next months.

08 **Off the Shelf**
A look at new and innovative products.

10 **Power Trip – BMP Mini Tiger**
This shrunken replica Tiger diesel of 0.5cc is put through its paces by Maris Dislers.

14 **Plan Feature – Golden Eagle III**
Keith Palmer has resurrected this pre-war gull wing beauty. Plans available from ADH.

20 **Rocket Propulsion History**
Before Jetex rockets were being used to power models. Roger Simmonds looks back.

24 **A Wind Tunnel at School**
Cameron Liddell-Grainger shares with us his Design & Technology A' level project.

26 **FF World Cup**
Two free flight World Cup events in one weekend at Salisbury are reported on by Mike Evatt.

28 **Scale Matters – Interscale 2015**
Bill Dennis reports from the international indoor scale at Nijmegen.

32 **FREE PLAN – CAPACITOR CUB**
Fred Burman's simple electric powered Depron Piper uses a capacitor for storage.

36 **Engine Repairs – Make a Piston**
Allan Joyce takes you step-by-step through making a flat topped piston on a lathe.

42 **Scale Space Rockets**
The Ukrainian competition for Europe's best rockets is reported on by Stuart Lodge.

44 **E.J. 'Eddie' Riding**
Richard Riding remembers his father the talented model designer and aviation enthusiast who contributed to AeroModeller in the 1940s.

50 **Impington Indoor Event**
The popular IVCMA event is covered by Andrew Boddington.

52 **Aerobatic Champion of Champions**
Paul Winter looks back at the prestigious CL aerobatics competition he organised.

56 **Better... than a Skip! Part 20**
John O'Donnell asks what he should do with a lifetime's worth of ephemera?

60 **Aeromodelling in the RAF**
Neil Tricker tells us about the RAFMAA.

62 **Gilding's Aero Engine Auction**
What delights were sold at the annual sale? Andrew Boddington was there.

64 **Free Flight Forum**
Mike Evatt gives a flavour of this event for FF flyers, held after the BMFA AGM.

66 **Tail End Charlie**
The thoughts of Chris Ottewell.

AERO MODELLER

Doolittle Mill, Doolittle Lane, Totternhoe,
Bedfordshire LU6 1QX, England

Issue 945, February 2016
(Issue ADH027 since published by ADH)

How to contact us:

Tel: 01525 222573
Fax: 01525 222574
Email: enquiries@adhpublishing.com

Editorial:

Editor: Andrew Boddington
Email: editor@aeromodeller.com
Publisher: Alan Harman
Administration Manager: Hannah McLaurie
Office Manager: Paula Gray
Advertisement Manager: Sean Leslie
Editorial Design: Peter Hutchinson & Alex Hall

Advertisement and circulation:

ADH Publishing, Doolittle Mill, Doolittle Lane,
Totternhoe, Bedfordshire LU6 1QX, England

Tel: 01525 222573 **Fax:** 01525 222574
E-mail: enquiries@adhpublishing.com

Distribution:

Seymour Distribution, 2 East Poultry Avenue,
London, EC1A 9PT
Tel: 020 7429 4000

Newstrade:

Select Publisher Services, 3 East Avenue,
Bournemouth, BH3 7BW
Tel: 01202 586848 **E-mail:** tim@selectps.com

Subscriptions:

ADH Publishing, Doolittle Mill, Doolittle Lane,
Totternhoe, Bedfordshire, LU6 1QX.
Tel: 01525 222573 **Fax:** 01525 222574
Subscribe: 12 issues – UK £55, Europe £73, Worldwide £82

Website: www.aeromodeller.com



AeroModeller is published monthly by ADH Publishing Ltd, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire, LU6 1QX. Entire Contents © 2016 ADH Publishing Ltd. Reproduction in part or whole of any text, photograph or illustration without written permission from the publisher is strictly prohibited. While due care is taken to ensure the content of AeroModeller is accurate, the publishers and printers cannot accept liability for errors and omissions. Advertisements are accepted for publication in AeroModeller only upon ADH Publishing's standard terms of acceptance of advertising, copies of which are available from the advertising sales department of AeroModeller.



Keith Palmer's graceful Golden Eagle is the plan feature.

HEARD AT THE HANGAR DOORS

EDITOR JOINS THE DARK SIDE?



Your editor (left) researching but not seduced by the Parrot Bebop 2, along with Neil Mead editor of RC Rotorworld and Drone Zone. (Photo by David Rawlins)

The accompanying photograph shows your editor (left) at the recent launch of the Parrot Bebop Quadcopter Drone 2 in London. The Bebop has a HD camera and can fly for 25 minutes non-stop, yet only weighs around 0.5kg (1lb), and is distributed in the UK by Flying Toys (www.flyingtoys.com) run by David Rawlins who you may also remember for DPR models and the innovative children's model kits in the 1990s. So should you be worried that AeroModeller will be dropping Balsa and Building models in favour of Rotors and Ready-To-Fly? No, there already other titles in the ADH Publishing stable, Rotorworld and Drone Zone, which make an excellent job of covering these areas of aeromodelling, edited by my colleague Neil Mead seen in the right of the photo. Whether one participates or even approves of different forms of flying models, it is important to have an understanding of what else is going on in our hobby for a variety of reasons:

- The technology deployed in some of the latest flying creations is outstanding and could be of use in other forms of aeromodelling (as has been seen in the use of GPS to data log

and find FF duration models).

- The general non-modelling public will probably not differentiate between fixed wing and rotor models, or between FF, CL or RC, so whether we like it or not we are part of a very diverse group.

- For me the flight pattern of drones is intriguing to watch, like some giant prehistoric dragonfly.

So you won't be finding Quadcopters and Drones in here anytime soon, but you might find that some of the functionality rears its head in a different guise - I could see the guidance enhancements that allow a drone to return to a pre-tagged point in space as possibly being one technological component of small field FF duration flying.

I know that drone flying can be seen as a problem by traditional, long term flyers of models, but whether we like it or not the capability exists and I feel we should embrace this new group as part of our wider brethren, and work together to ensure continuation of model flying in a responsible manner in open spaces around the country.

Regards, Andrew Boddington
editor@aeromodeller.com

BUT WHAT IS THIS... AN RTF?

So just to be perverse I will feature these small foam RTFs I saw at the last Old Warden of 2015! Colin Fone and Chas Campen had taken a couple of foam Alpha Jets gliders from FMS Models, which are probably great fun off the shelf for juniors to chuck around, and had adapted the front end to take a Cox Pee Wee 020. They flew with an exhilarating and jet like performance, so to my mind they qualify for inclusion in AeroModeller as there was some degree of individual innovation, they flew, and best of all they enjoyed doing it.

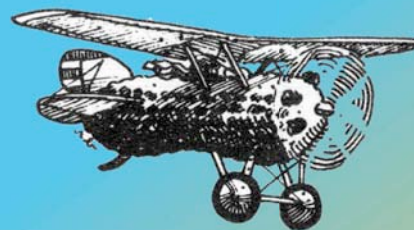
At £8.99 these Alpha Jets gliders from www.fmsmodel.com make for a cheap base for powered experiments.



FLYING TABLE DECORATIONS!

So what table decorations did you have over the festive period? Probably holly, candles and crackers? Steve Midson thought we might be interested and amused by these 'Table Decorations' he recently supplied to the West London Aeroplane Club 'Joystick Group', for their Battle of Britain themed dinner.

Steve is probably best known for his work through Midair Models encouraging youngsters to build and fly small glider and rubber powered models in schools and youth groups – see www.midairmodels.co.uk. For this event he produced various small foam WWII British and German flying models with the expectation of plenty of 'wine fueled' dogfights ensuing in the dining hall!



PLANS & THINGS

High quality scale free flight plans and modelling publications

Your source for:

- Plans by W.C. Hannan Graphics
- Bill Hannan Books
- Frank Zaic Year Books

www.plansandthings.com

COUPE EUROPA, MIDDLE WALLOP



Alan Brocklehurst searches for the elusive thermal.



David Beales with his Etienvre.

Thanks to Don Thomson and Martin Dilly for this short report and photos, for what we

hope isn't the last FF event at Middle Wallop.

Croydon and DMAC again held the annual Coupe Europa competition for F1G and Vintage Coupe free-flight classes at Middle Wallop airfield on 4 October 2015. F1G was held in rounds, to the proper 5 flights format and Vintage was for 3 flights without rounds.

The day started cool with minimal drift, so the max was set at 120 seconds for both classes.

In the afternoon, the breeze increased and some models left the field, so the max for the last 2 F1G rounds was reduced to 90 seconds. Early conditions gave some good lift, but later the conditions were trickier, so the number of maxes per round were the same with the 90 sec max as for the previous 120 max. Some strong lift was evident, including

an unfortunate flyaway by Dave Greaves' model, and also some large downdrafts. Notably Alan Brocklehurst, flying his well-known, successful, No 3 F1G and aiming for his 5th max to make the flyoff, was hammered down to land at prop fold for only 71 sec. Other people had the usual gadget troubles, Peter Hall managing to have his prop start fail twice in the same round. However, Roy Vaughn demonstrated faultless operation of his high-tech model. By contrast Chris Redrup had a vintage Etienvre airframe with 2 bladed prop for F1G. This model was recognisable in the air by its unusual dutch-rolling behaviour whilst on the climb.

The scores resulted in only 2 people in the flyoff for each class; Roy Vaughn and Chris Redrup in F1G, and Ted Challis and Gerry Ferer in Vintage coupe. The flyoff was to the Middle Wallop DT format, with a 60 sec DT. First away was Ted Challis with his Etienvre, who found a good

piece of lift and DTed at exactly 60 seconds to give the best score. Roy Vaughn decided to add some drama, by breaking his prop blade whilst waiting to launch. He returned to his car, effected the repair, returned to his thermistor pole to pick his air, and flew with still 3 minutes of the flyoff to spare. Roy won F1G by 32 secs over Chris and Ted won Vintage by 10 secs over Gerry. The Flitehook Trophy for teams of 3 flyers was won narrowly by Crookham, ahead of Bristol & West, neatly reversing last year's result.

The prize-giving followed, and Croydon made a special presentation to John Thompson and Roger Newman of SAM1066, in appreciation of their continuing efforts to ensure smooth running of the events at Middle Wallop. The Croydon club also thanks the BMFA London Area for their support for our events.

Full Results on www.aerromodeller.com

IVCMAC Talk on Computer Generated Coverings

The next Impington Village College MAC open Indoor Meeting will be held on March 20th 2016, 9.00am to 5.00pm, and will include a seminar by Roger Simmonds and Rob Smith on computer graphics for application to Depron or balsa models.

Come and fly indoors all day for £6.00, with FF in the large Sports hall and in

an adjoining hall RTP, small electric helicopter and radio flying. There will be help trimming and a competitions for the late Clive King's Indigo (see AeroModeller November 2015) and Bostonians. Also a rubber powered car race!

Contact Chris Strachan for details, 01223 860498, chris.strachan@btinternet.com, or see www.impmac.co.uk.



Roger Simmonds used computer generated graphics to decorate this Hawk which was the free plan in July 2014. Find out more at the IVCMAC event.

PASSING OF TWO EX-EDITORS OF AEROMODELLER



Steve Dorling edited both AeroModeller and AMI earlier this century.

Steve Dorling RIP

Readers will be sorry to hear that well-known aeromodelling journalist Steve Dorling died of cancer on 12th December 2015, at just 61 years of age. I turned to Steve's long-term friend, the photo-journalist Alex Whittaker, to write the following.

"Steve was probably best known as the editor of AeroModeller and Aviation Modeller International (AMI) magazines. In an earlier career Steve had been a Government Intelligence Officer. As 'Engineer', he made lively contributions to website forums, and also wrote

features and columns for all the main UK modelling magazines.

He could fly anything, and was highly competent in every means of propulsion known to the keen aeromodeller. Beside model aircraft, he was mad keen on motorcycles. In addition, he was a handy photographer, and could paint a very convincing watercolour. Furthermore, he knew his way around a guitar, and possessed a great chordal repertoire. Over the years, and in all weathers, I covered many photo-shoots and events with Steve. Despite the rain, hail, or snow the craic was always first class. Since we were both Englishmen cast adrift in North Wales, we could often fly and work together. He and his wife Linda sometimes dropped in for a meal or to pick up a review model on their way further west. We also enjoyed many a late-night session at the Nats Bar. He was a sharp lad with a ready wit, but he had absolutely no malice in him. Consequently, he was dearly loved by his flying mates."

Our condolences go to his wife Linda, his son Chris and all his family members and friends.

Peter Freebrey RIP

Peter Freebrey passed away quietly at home on 4th November 2015 at the age of 77 years. Peter was editor of AeroModeller in the mid-1980s. Thanks to Stuart Lodge and John Wheddon for their help in compiling this obituary.

"It is sad news that one of pioneers of Aero and Space Modelling, Peter Freebrey, has passed away. He died quietly at home following several years of declining health. Peter leaves his wife Fran, son Philip, daughter Susan and three grandchildren.

Before getting interested in spacemodelling he already had a remarkable career in aeromodelling. He became CIAM F2 SC Chairman in 1972 and held this position next four years. Peter continued his work with CIAM for many years and in 1986, was elected the CIAM 1st VP and successfully held this post till 1991.

Pete's contribution to SMAE/BMFA was enormous, running it single-handedly through some bleak years. He was a Council member and FAI Delegate for a long period of time. On the flying side he was at the heart of the Northwood Model Flying Club in the early days of its prominence in Control Line Combat – he designed the Panic combat model. In addition, he flew almost all the Free Flight classes and introduced us in the UK to Model Rocketry-Space Modelling in the 1970s. His greatest achievement was becoming World Champion in S5E-Scale altitude, at the 1974 World Space Modelling Championships. Peter was editor of AeroModeller magazine during the mid-1980s, but still found time to commit to Photography, Astronomy and Fishing. Post-retirement, he devoted a lot more time to Astronomy, running courses at local colleges.

We older Aero/Space Modellers will keep Peter as an excellent friend in our memories for ever."



Peter Freebrey (far right) with the British Combat team at the Criterium of Aces in 1961. Photo by Norman Butcher for Model Aircraft.

Up & Coming

AeroModeller Calendar of Events

Please note that the events listed are compiled weeks in advance of publication, and you should check before travelling in case of change. For future inclusion of your events, please send an email with date and details of the event in a format similar to those shown below to editor@aeromodeller.com

JANUARY

17 January

BMFA SW Area Indoor Flying, Saints Centre, St Austell PL26 7AG. 12:00 to 16:00. FF & micro RC. David Powis 01579 362951 dave_powis@hotmail.com, Roger Bellamy 01752 257826

24 January

OFMAC Indoor FF, Abbey Sports Centre, Green Furlong, Berinsfield OX10 7NR. 08:30 to 16:00. FF Rubber, CO2 & Electric. Flitehook in attendance. Dave Dobson 01491 837789 ofmac1@talktalk.net

30 January

Tonbridge Gassers & Rubber Fanciers Indoor, Sports Centre, 601 Maidstone Road, Rochester ME1 3QJ. 18:30 to 22:00. FF & RC. Eric 01622 737814 eric.przyjemski@btinternet.com

31 January

Future of Free Flight Conference, Husbands Bosworth airfield (HQ of Coventry gliding club), Near Leicester. Changes to Military land use and implications for FF, organised by FFTC of BMFA. Mike Woodhouse MichaelWoodhouse1942@gmail.com 01603 457754

FEBRUARY

1 February

Westland & Yeovil Indoor Flying, Sports Hall, Crewkerne TA18 7NT. 19:00 to 21:00. FF & RC. www.home9999.plus.com/WHLMAC/news.htm Jack Mitchell jack@home9999.plus.com

6 February

Peterborough MFC Indoor, Bushfield Leisure Centre, PE2 5RQ. 10:00 to 13:00. FF & micro RC (no rotors/shockie). www.peterboroughmfc.org

6 February

Home Counties Swapmeet, Village Hall, Benner Lane, West End, Surrey GU24 9JP. 10:00 to 13:00. Martin Thompson 07401914341 ccmfa2015@hotmail.com

7 February

Crawley 41st Indoor Meeting, K2 Leisure Centre, Pease Pottage, RH11 9BQ. Free Flight 11:00 to 17:30. RC 17:30 to 20:00. FF Comps for CLG/HLG, Peanut & Open Scale, EZB, Living Room Stick, Gyminnie, Legal Eagle & Hangar Rat. John Dart 01293 420830 johndart17@aol.com or www.cadmac.org

7 February

Flitehook Indoor FF Meeting, West Totton Centre, Hazel Farm Rd, Totton SO40 8WU. 10:00 to 16:00. Flyers £6, Spectators £2. flitehook@talktalk.net 02380 861541

Old Warden

Reminder that the dates for the Modelair model flying events at the Shuttleworth Trust, Old Warden SG18 9AE in 2016 are:

14-15th May, Mayfly Event with Ron Moulton Memorial on the Saturday, and Ebenezers on the Sunday.

23-24th July, Scale Weekend.

24-25th September, Festival of Flight including Vic Smeed Memorial on the Sunday.

12 February

Indoor Fun Flying, Stalham High School, Norfolk NR12 9DG. 19:00 to 22:00. Mainly FF, plenty of help for newcomers. Richard Crossley 01692 407936 richardcrossley@btconnect.com

13 February

BMFA NW Area Indoor FF Gala, Velodrome, Stuart St, Manchester M11 4DQ. FF Duration incl. Bostonian & Legal Eagle, Scale incl. Open, Pistachio & Peanut. David Whitehouse for Duration 01942 897816 whitehousejdavid@googlemail.com, John Minchell for Scale 07989 744251 j.minchell@btinternet.com

13 February

North London MFC Indoor RC, Furzeffeld Sports Centre, Potters Bar, EN6 3BW. 18:00 to 22:00. Fixed Wing to 225g, Heli to 400g RC. Peter Elliott 01707 336982

14 February

BMFA SW Area Indoor Flying, Saints Centre, St Austell PL26 7AG. 12:00 to 16:00. FF & micro RC. David Powis 01579 362951 dave_powis@hotmail.com, Roger Bellamy 01752 257826

14 February

BMFA FF 1st Area Centralised, Area Venues. FF - F1A, F1G, Comb Power, E36, Mini Vintage. Area Comp Secs via BMFA 0116 244 0028 admin@bmfa.org

27 February

ITC Indoor Event, Manchester Velodrome, Stuart St, Manchester M11 4DQ. 11:00 to 18:00. Slots for FF & RC - no shocks. David Whitehouse 01942 897816 whitehousejdavid@googlemail.com

28 February

Beverley and District MAC Spring Swapmeet, Tickton Village Hall, near Beverley, HU17 9RZ. 09:00 to 12:00. Entry £1.00, Tables £5.00. Brian Jenkins 2bee. days@live.com, 07970 959875 or www.badmac.btkc.co.uk

28 February

OFMAC Indoor FF, Abbey Sports Centre, Green Furlong, Berinsfield OX10 7NR. 08:30 to 16:00. FF Rubber, CO2 & Electric. Flitehook in attendance. Dave Dobson 01491 837789 ofmac1@talktalk.net

MARCH

5 March

Brightlingsea MFC Swapmeet, Village Hall, Clacton road, St Osyth, Essex CO16 8PE. 09:30 to 11:30. Bob Goodenough 01206 303749 www.forjac.co.uk

6 March

Flitehook Indoor FF Meeting, West Totton Centre, Hazel Farm Rd, Totton SO40 8WU. 10:00 to 16:00. Flyers £6, Spectators £2. flitehook@talktalk.net 02380 861541

6 March

BMFA SW Area Indoor Flying, Saints Centre, St Austell PL26 7AG. 12:00 to 16:00. FF & micro RC. David Powis 01579 362951 dave_powis@hotmail.com, Roger Bellamy 01752 257826

6 March

The Great Southern Model Auction, Mountbatten school, Romsey, Hants SO51 5SY. 09:00 to 15:30. Pre-book lots www.hmfa.hampshire.org.uk Paul Bench 07500 175897 hmfa@btinternet.com

12 March

Indoor Fun Flying, Stalham High School, Norfolk NR12 9DG. 19:00 to 22:00. Mainly FF, plenty of help for newcomers. Richard Crossley 01692 407936 richardcrossley@btconnect.com

12 March

North London MFC Indoor RC, Furzeffeld Sports Centre, Potters Bar, EN6 3BW. 18:00 to 22:00. Fixed Wing to 225g, Heli to 400g RC. Peter Elliott 01707 336982

13 March

Peterborough MFC Indoor, Bushfield Leisure Centre, PE2 5RQ. 10:00 to 13:00. FF & micro RC (no rotors/shockie). www.peterboroughmfc.org

20 March

IVCMAC Indoor Meeting, Impington Village College, Nr Cambridge. 09:00 to 17:00 Large hall for FF, and separate hall for RTP and small RC. Talk on printed computer graphics finishes for Depron & Balsa. Chris Strachan 01223 860498 chris.strachan@btinternet.com www.impmac.co.uk

25 March

BMFA FF Northern Gala, North Luffenham. Comb Glider, Comb Rubber, BMFA power, Comb Electric, SLOP, F1H, P30, 1/2A, Mini Vintage, HLG/CLG. G.Warburton 0113 2852947 gwarb@aol.com

27 March

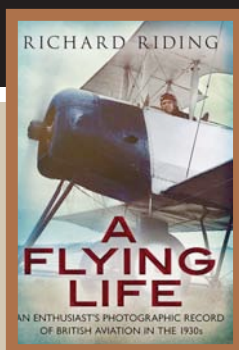
Horam Swapmeet, Village Hall, Horam TN21 0JE. 10:00 to 13:00. Tables £8, proceeds to Air Ambulance. T. Inman 01892 652734 oilerinman@btinternet.com

Redfin 030 F1 Millich Diesel

A change of direction for Alex Phin of Redfin engines with his latest 0.5cc diesel – this is the first of his engines to be Front Rotary Induction – all the other marks have been Rear Induction (either Side Port or Reed Valve).

The engine is designed to be high performance, thus the F1 tag, and it features twin ball race and the same high quality finish as all his latest Ukrainian manufactured engines. The crankcase is an adaption of the basic design used on the 030 Millich V2, but to highlight the upgrade from Mills type performance and to acknowledge it's Eastern European origin, Alex has had the name changed on the crankcase to 'Millich'.

We will of course have a review of the 030 Millich F1 in a future issue of AeroModeller, and it will be interesting to see how it compares with other small high-performance diesels of 0.50-0.55cc currently available. The 030 Millich F1 is £85 plus delivery. Contact Alex at Redfin www.redfinengines.com telephone 07859 275942 or e-mail alex.phin@talktalk.net Australian readers can contact Ian Dixon on email ian@perthartglass.com.au www.carambamodels.com



A Flying Life: An Enthusiast's Photographic Record of British Aviation in the 1930s

Elsewhere in this issue you'll find Richard Riding's biography of his father E.J. 'Eddie' Riding's aeromodelling career. This book by Richard, newly published in paperback form, consists of photographs taken by E. J. Riding and gives shape to the full-size aviation part of his life. He was apprenticed to A. V. Roe & Company and employed as an aircraft engineer up to the outbreak of war. During the war, Riding became an AID inspector and was seconded to Fairey Aviation, London Aircraft Production, and the de Havilland Aircraft Company, where he signed out Halifax bombers and Mosquitoes as airworthy and ready for test flying.

Riding began taking photographs of aircraft in

1931, aged fifteen. Fortunately, he kept copious notes recording the locations and dates of when and where the aircraft were photographed. More importantly, he noted aircraft colour schemes – details rarely recorded by the press at the time. The range of aircraft types photographed by Riding includes Tiger Moths, RAF fighters, ultralights, and airliners. Together they give an extensive cross-section of flying in Britain up to the outbreak of the Second World War.

This paperback book has 256 pages and is published by Fonthill Media www.fonthillmedia.com and priced £16.99. ISBN: 978-1-78155-446-3

Dens Model Supplies - Towline Start E- Zee Glider Timer

The E-Zee SDG2 Glider Timer is an enhanced version of the SDG1 - same timer but with an optional towline release start and location sounder.

The DT timing can start as soon as the pushbutton is operated OR only when the glider leaves the towline – the towline start feature is aimed towards competition fliers and requires fitting the glider with a set of towline operated contact's which

start the timer. A piezo sounder can also be connected to the timer, this emits regular beeps following DT to allow fliers to more easily locate models landing in tall grass/crops or on the far side of a boundary hedge etc. Field trials have shown that the model can be located up to 50m away with a sounder fitted.

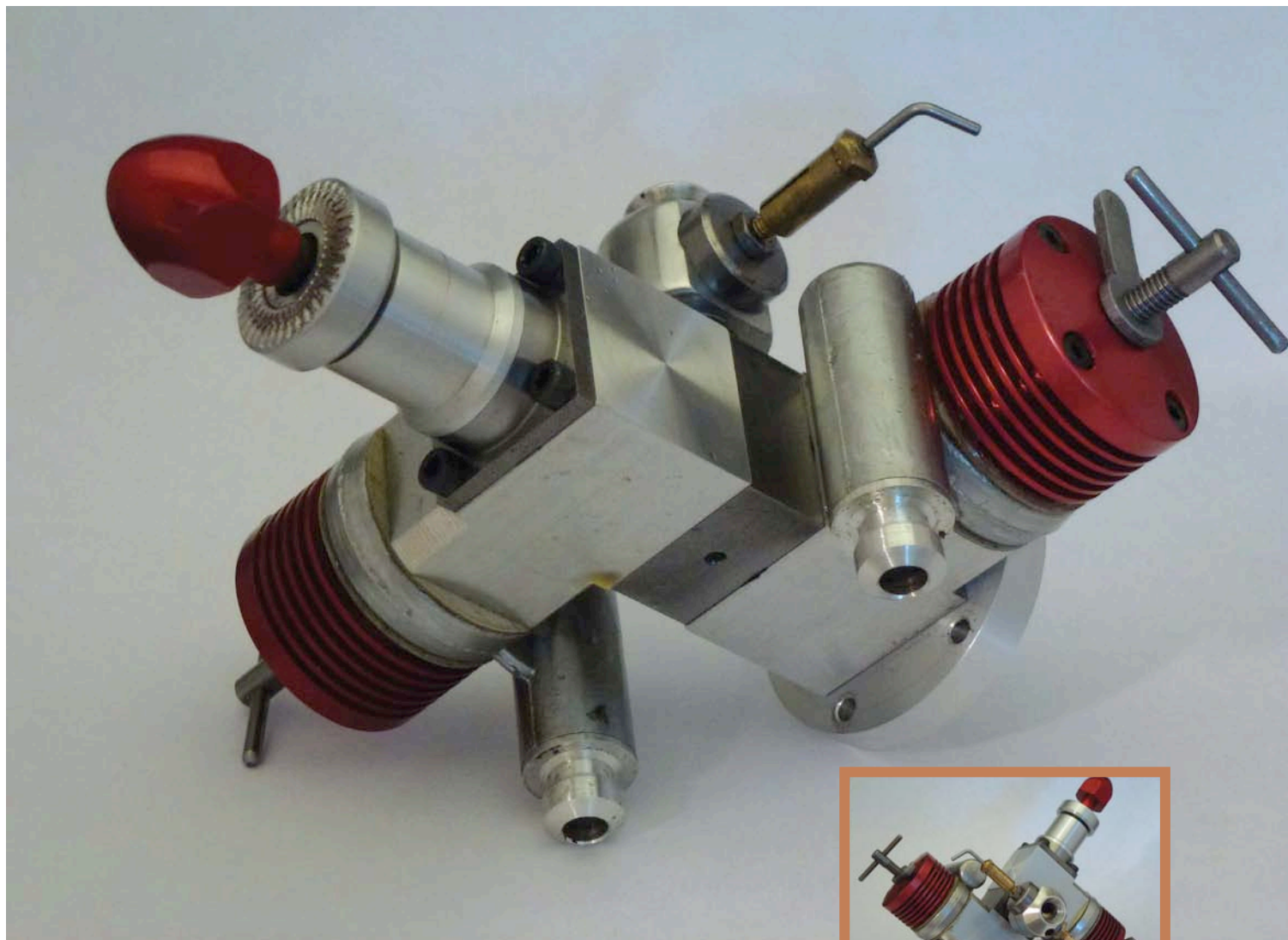
The timer is supplied with a comprehensive instruction manual and users guide. Micro

Switch and Sounders are available as extras in the form of 'plug & play leads'.

SDG2 Glider Timer is £16.50 + p&p from Dens Model Supplies in UK www.densmodelsupplies.co.uk 01983 294182.

E-Zee Timer agent/stockist wanted for Aus/NZ, contact Den Saxcoburg for details.



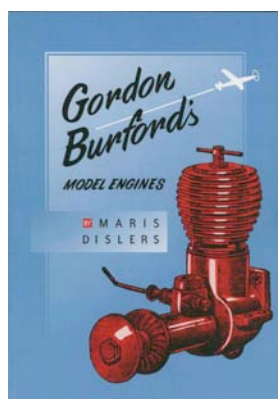


PAW 38 Twin

Just a sneak preview of this new limited edition opposed twin diesel of just over 6cc total capacity by the leading UK engine manufacturer PAW. Much work

has gone in to the development to ensure that it was a useable motor with good response to the RC throttle. We plan to have a full review in the next issue.

PAW (Progress Aero Works) website is
www.eiffelaender.com
Telephone +44 (0)1625 423891



Gordon Burford's Model Engines

Over three decades, Gordon Burford produced an extraordinary variety of model engines under the GB, Sabre, Taipan and Glo Chief brands, before exploring further 'retirement' engine projects. This book describes the full suite of engines, includes many test results to assess their performance and superb photographs of the best examples of each that could be found. Historical information in the narrative puts these engines and their individual technical features into the context of their times. Also described are engine boxes and minor parts like needle valves and screws example instruction sheets, plus example instruction sheets for the benefit of collectors. The book is written by Maris Dislers, the Power Trip columnist

for AeroModeller, and is a limited reissue which remains largely unchanged. However, there are an extra eight pages, with further engine tests and other new material. It will appeal to anyone interested in the technical aspects of model engines and provides a fascinating view into Australian modelling during the exciting decades following World War 2.

Printed in full colour on quality paper, this soft cover A4 format book has 208 pages. Price is \$75 (Australian dollars) plus P&P. Enquiries to; Maris Dislers, 67 Glengyle Terrace, GLANDORE SA 5037, AUSTRALIA
jamd@adam.com.au

BMP Mini Tiger

In the world of model engines, there are a select few that have inspired flattering imitations and latter-day replicas. Even miniatures. The Oliver Tiger Mk 3 is right up there with the best of them and I wouldn't be surprised if someone has gone even further by having one gold plated.

Arne Hende was first with a mini Tiger. A real goer, but perhaps a bit too far removed in looks, which led to a more accurate Series 2 engine and then a further 50 units with imperial bearings made for Barton Model Products (BMP). Tom Ridley's Clint Hill Engineering also made some fine mini Tigers, which have the added cachet of being made by the current manufacturer of the Oliver engine line. More recently, CS Engines made a limited run of NAVO Mini Tigers, as reviewed by Adrian Duncan in *Aero Modeller* August 2015.

With the news that CS have withdrawn from the model engine business, the only currently available Mini Tiger is made in Ukraine by Technohobby for Baron Model Products. It uses the original crankcase tooling for the Hende Series 2 engines, but benefits from more modern machinery and more experience. Let's take a close look at this fine new engine.

Appearance

This engine is a 6/10 scale representation of the most common Mk 3 variant – the one with die cast crankcase, before the cylinder hold-down bulges were extended to the main

case diameter. Scaling is in terms of linear dimensions and naturally, swept volume shrinks from the Oliver's original 2.47cc to a little over 0.5cc.

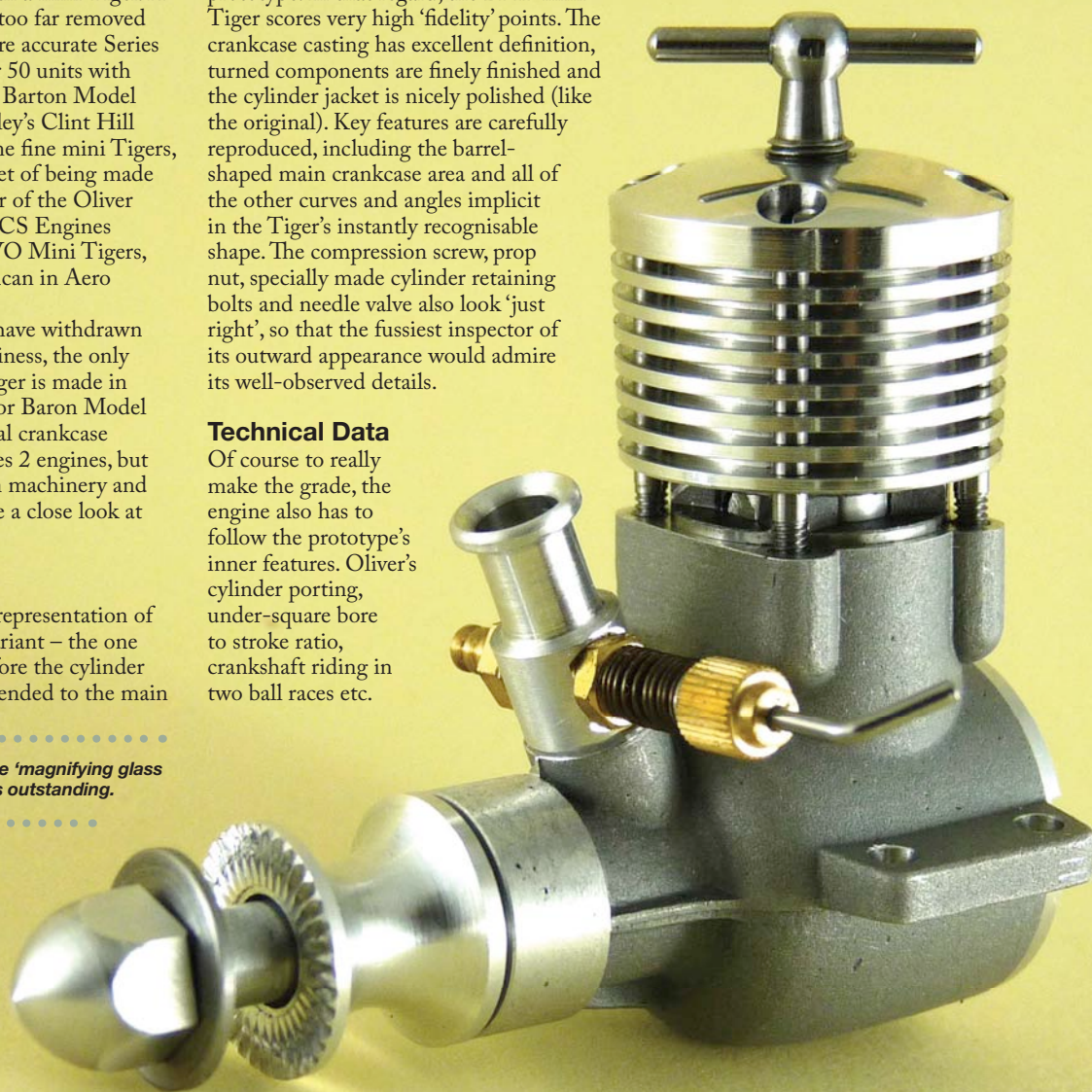
Many minis live their entire lives 'new in box', admired for their beauty and how accurately they represent the original prototype. In that regard, the BMP mini Tiger scores very high 'fidelity' points. The crankcase casting has excellent definition, turned components are finely finished and the cylinder jacket is nicely polished (like the original). Key features are carefully reproduced, including the barrel-shaped main crankcase area and all of the other curves and angles implicit in the Tiger's instantly recognisable shape. The compression screw, prop nut, specially made cylinder retaining bolts and needle valve also look 'just right', so that the fussiest inspector of its outward appearance would admire its well-observed details.

Technical Data

Of course to really make the grade, the engine also has to follow the prototype's inner features. Oliver's cylinder porting, under-square bore to stroke ratio, crankshaft riding in two ball races etc.

are faithfully reproduced to scale. We noted some departures; the conrod has a rectangular section (not round), tops of cylinder ports are not squared off, front/rear clearance arcs in piston skirt add significantly more sub-piston induction, effective choke area is substantially

The BMP Mini Tiger passes the 'magnifying glass test' with ease. Build quality is outstanding.



0.5cc

Maris Dislers reviews the latest shrunk replica of a classic diesel - this little beauty also reproduces the quality of the original. Three View Diagram by Chris Barron.



The unmistakable Mk 3 Tiger's shape and proportions are faithfully reproduced, including the barrel-shaped main crankcase section.



Mounting lugs are mighty narrow and holes are close to the edge at this scale. You'll need M2 or 2-56 mounting screws.

larger. Cylinder bore is hard chromium plated. Naturally, bearings, threads, crankpin and gudgeon pin diameters etc. are metric. However, it generally represents the standard (not factory modified) Oliver Tiger engine

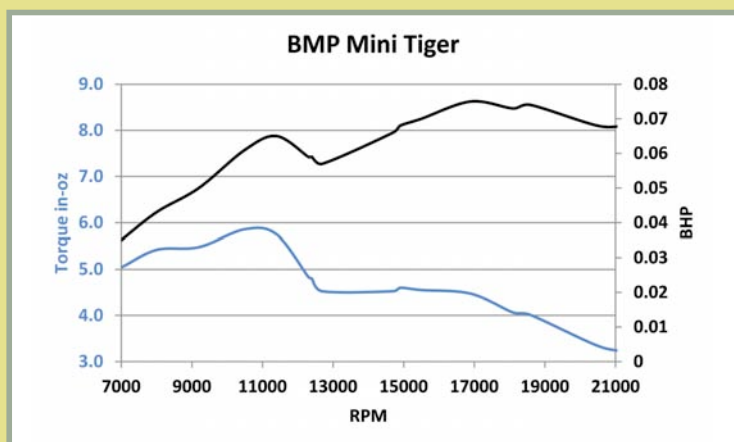
in miniature, with particulars given in the 'numbers' table.

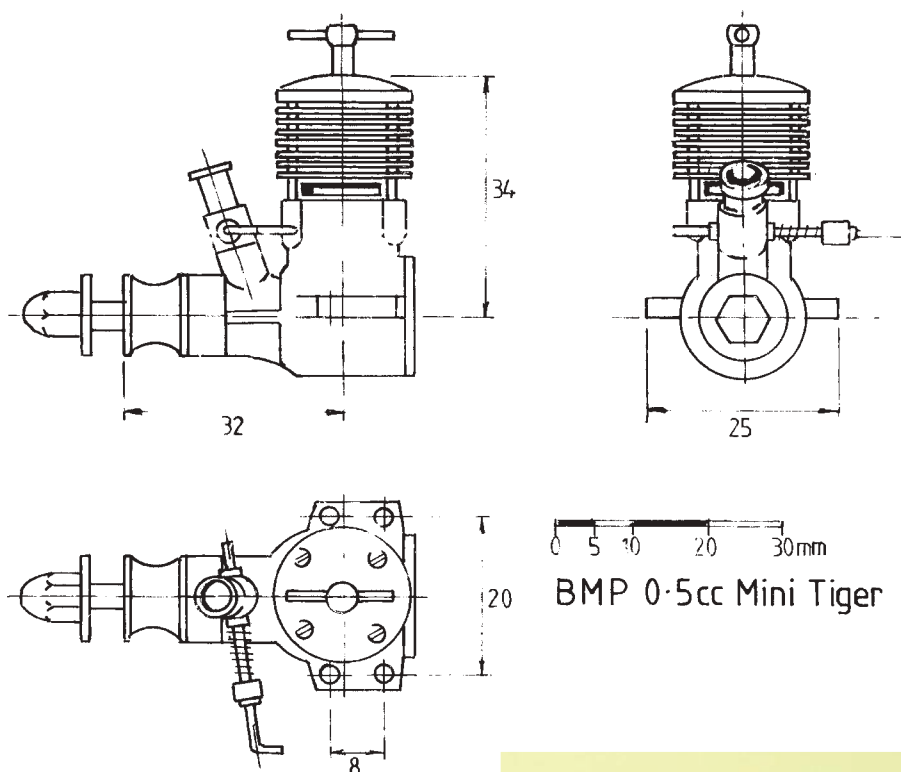
On the Test Bench

Running in was uneventful thanks to the

BMP Mini Tiger's beautifully free bottom end and excellent fits. We began with a 7x3 propeller and were impressed by the easy starting. A choke or two and it would go in a few flicks. Running with this prop size is

| | |
|--|-------------------------|
| Swept volume | .53cc (.032 cu in) |
| Bore | 8.43mm (.332 in) |
| Stroke | 9.53mm (.375 in) |
| Bore to stroke ratio | .88 to 1 |
| Weight | 34g (1.2 oz) |
| Height (mounting face tot top of cylinder) | 32mm (1.26 in) |
| Length (back plate to prop driver face) | 38mm (1.5 in) |
| Exhaust duration | 146 degrees |
| Transfer duration | 126 degrees |
| Crankshaft intake opens | 33 deg. ABDC |
| Crankshaft intake closes | 13 deg. ATDC |
| Sub-piston induction front/rear ports | 100 degrees |
| Sub-piston induction side exhaust ports | 60 degrees |
| Effective choke area | 3.9 sq mm (.0061 sq in) |
| Maximum power output | .074 BHP at 17,000 RPM |
| Peak torque | 5.8 in-oz at 11,000 RPM |





fine, but this engine is really meant for higher speeds. When typical sport 'point fives' are running out of puff, this engine wakes up. So to complete the running in process, it needs to be worked at high speed to fully settle the piston/cylinder fit. We switched to an APC 5.5x2 propeller to bring it up to around 18,000 RPM for a further ten two-minute runs.

No need to worry about narky, snappy handling. Starts are quickly made with small propellers by first opening the needle half a turn and priming the exhaust with piston closing the port. Choking didn't work as well with the more closed needle setting. One or two flicks and it's away. The Mini Tiger gets to operating temperature quickly – you can feel that via the compression screw. That gets a bit hot, but not enough to make final adjustment uncomfortable.



The classic cylinder porting that gave excellent power and fuel economy is reproduced in miniature. Slick hard chrome cylinder bore should increase engine life and add a little to top end performance.

Mixture adjustment is somewhat vague at lower speeds owing to the large choke area, but is much better at peak operating speeds. The engine can be set quite rich off peak without much loss in RPM and there's adequate warning if you go too lean. Response to compression adjustment and

tolerance against overheating are very good.

Vibration levels were low at all test speeds. Fuel economy is not exceptional, needing around 1.5 ml per minute at 10,000 RPM. Overall, the BMP Mini Tiger is a delight to operate.

Performance Appraisal

Frankly, we expected trouble from the audaciously large choke area, but bench runs went through with minimal trouble and the performance curves are based on engine performance in the as-delivered state. However, we reckon it won't go so well in a flying model, with poor suction then evident. It's easy to bung a slip of balsa into the venturi, blocking off half of the choke area. That doubles airflow speed at the spraybar location for more consistent fuel delivery in manoeuvres. In this form, it gave acceptable resistance to mixture setting change when raising and lowering the fuel tank by up to 75mm each way. More good news came when we could detect no effect on running RPM (within the usual repeatability variations) for any prop in the useable speed range. That's still more than the calculated, scaled down 1.6 square mm equivalent of the original Oliver Tiger on a per cc swept volume basis. However, the Mini Tiger peaks at 20% higher RPM than the Oliver prototype, so we figure half-choking this Mini Tiger is about right.

Our fuel containing 25% castor oil, 30% ether and 45% kerosene, with 1.5% EHN added, seemed spot on. Any similar commercial fuel should work fine, but don't be too stingy on oil content. Small diesels seem to work best with plenty of that.

The Mini Tiger's performance characteristics are a little more complex than most. Power and torque rise quite steeply with increasing speeds until around 11,000 RPM, where maximum torque of 5.8 oz-in is indicated. Soon afterwards, there's a marked dip extending to around 12,500 RPM. Torque then levels off, allowing power to regain its former level by 15,000 RPM and climb towards an eventual peak of 0.074 BHP at around 17,000 RPM. Torque then drops, with power output easing to .068 BHP at 21,000 RPM. You can get that upper speed



Mini Tiger's crankshaft follows Oliver design, down to true scale 1/4 inch main journal diameter. Bump in diameter in front of crank web accommodates 7mm ID rear ball race – presumably a more practical choice for the makers than an inch size. Propellers will need to be drilled 4.5mm or 3/16 inch for the prop nut.



The finish on all the engine's components oozes quality.

comfortably with a Graupner 5x2 propeller and there's no indication that the engine is straining. It's not of any real use in the air, just something to savour for test bench jockeys.

Given its nature, we present both curves by simply joining the sixteen data points. Normally we use a trend line function, but it might not have clearly shown what went on. Just don't read too much into individual bumps from single test results).

We would not really group this engine with the pop-along brigade for slow flying models. Yes it can be nicely backed off for under-compressed running, but why pay that much money and not use its full potential? Somewhat like using your E-type Jaguar to pick up a takeaway curry. There's nothing wrong with operating this engine at mid-range speeds, but the real sparkle comes with

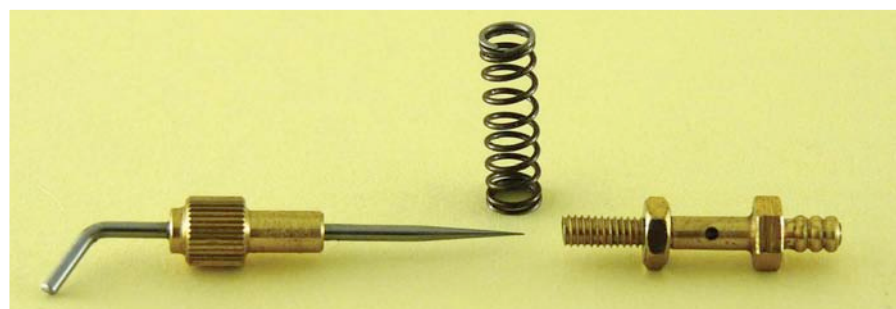
careful propeller choice.

A slightly trimmed 7x4 prop would work well for maximum torque and make use of the unexpected first power bump. Then to really appreciate this engine's competition pedigree, a prop with 3 inch pitch for sporting RC or 4 inch pitch with less diameter for CL, turning at least 14,000 RPM and up to 16,000 RPM on the ground will get you into its sweet spot. Let your tacho be your guide. Don't rely solely on the propeller makers' nominal sizes, as our results for some Master props (in particular) show. Experiment.

Summing up, this Mini Tiger will delight the person who admires excellent workmanship, lovers of miniature diesels and Oliver engine aficionados in particular. It is far more than a mere tchotchke with good looks alone. Any replica Oliver, even in

miniature, has quite big shoes to fill. This one really performs up to expectation with power output perhaps a little better (in proportion) than the standard 2.5cc Oliver Tiger and there's an interesting power and torque bump at moderate speed that the original larger engine did not produce. Starting and handling are as you would expect from a miniature racing engine. A real corker.

The BMP Mini Tiger, currently priced at £125, is available from Paul Goodall at Barton Model Products www.bamopro.co.uk, email sales@bamopro.co.uk or phone +44(0)1283 713 715. They also stock the usual spare parts necessary to keep these engines in top shape, including a planned plastic venturi insert of 3mm bore size, for improved suction, at £6.50. ●



NVA looks just like the Oliver one, but is really petite. Spraybar is drilled for the 1mm needle leaving paper wall section at the base of M2 thread. It won't stand up in a crash, or if the nut is over tightened. Ends of spring have been ground flat to reduce tendency for spring-back when making adjustments.

| Propeller | RPM |
|---------------|-------|
| APC 7x4 | 9200 |
| APC 7x3 | 11400 |
| APC 6x4 | 12300 |
| Master 6x3.5 | 12500 |
| Cox 6x3 black | 13200 |
| Master 6x4 | 13600 |
| Graupner 6x3 | 13600 |
| APC 6x3 | 14700 |
| Cox 5x3 black | 14900 |
| Master 5.5x4 | 14900 |
| APC 5.7x3 | 15500 |
| APC 5.5x2.5 | 16900 |



AVAILABLE
FROM

ADH

The Full Size Plan (No 613) for
the Golden Eagle III is available
on two sheets for £14.95 plus P&P
of UK £2.50, Europe £4.00 and
Rest of World £6.00, from ADH
Publishing www.adhpublishing.com/shop or +44(0) 1525 222573
using a credit card, or by
cheque payable to 'ADH
Publishing Ltd'.

Keith Palmer was first attracted to the small Golden Eagle three view in the 1938 Frank Zaic Aeronautical Yearbook, and having redrawn the plan he has now built several variations.



KONGEØRN

THE GOLDEN EAGLE III (OR THE WONKY WINGED WONDER) PLAN NO. 613

Keith Palmer has resurrected this design from the golden years of graceful duration models. There are no apologies for the fact that this is aimed at the experienced builder of vintage models, and as such there are no detailed instructions but some hints on how to approach the build; there are areas where you will need to decide the details of construction and you will need to build jigs for the fuselage and wing alignment. Anyone who has seen Keith and his friends flying their Eagles at Old Warden or Middle Wallop will know this model has a special appeal when in the air and is well worth the effort.

The winter of 1993 found me lying in Bedford Hospital recovering from a back operation and thinking about my next rubber model to build, perhaps something a bit different to the 'run of the mill' Wakefields. Frank Zaic's 1938 year book

provided the solution in the form of the Golden Eagle III designed by Harald Orvin of Oslo in 1937 - it came 2nd in the 'Scandinavian' of that year. It was 55 inch wing span with a wing area of over 300 sq.ins.

In researching the model, with the help of Per Hoff and Grim Ranstead two eminent Norwegian modellers, I discovered that Harald Orvin had passed away the year before, and to their knowledge no one had built the model since 1938. I was up for the challenge!

The summer of 1994 saw, perhaps, the first Golden Eagle to be flown since 1938 in England! It performed well at Old Warden and later in the year flew away at Middle Wallop achieving 18 mins O.O.S (the next one I built had a D.T.)

By 2000 I had built 4 more striving to get the overall weight down and eventually took 1st place in the SAM 1066 World

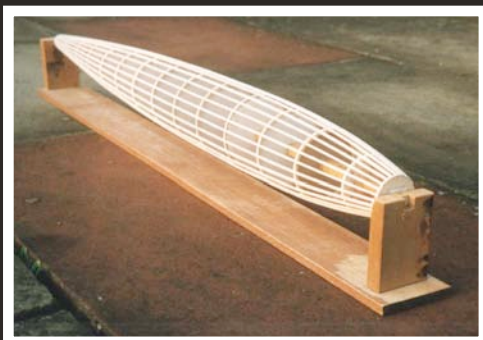
Championship for large rubber at Middle Wallop.

Over the past 20 years a few other modellers have built Golden Eagles using full size plans that I compiled. In fact we mass launched 6 at Middle Wallop! A good friend, Don Holder, could not understand how one could build 5 of the same complex model. He has now built 3 with 2 more fuselages on the stocks!

Fuselage

The fuselage was built on a jig using a square rod with cardboard discs to hold the round formers in place whilst gluing the stringers in position. In an effort to keep the weight down balsa selection is critical.

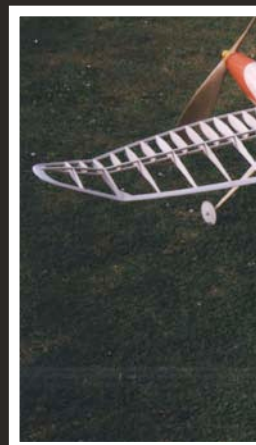
Take the diameter of the round formers from the plan and using a compass mark out the temporary cardboard discs allowing for around 3 layers of spiral wound 1/32" balsa for most formers, but going up to



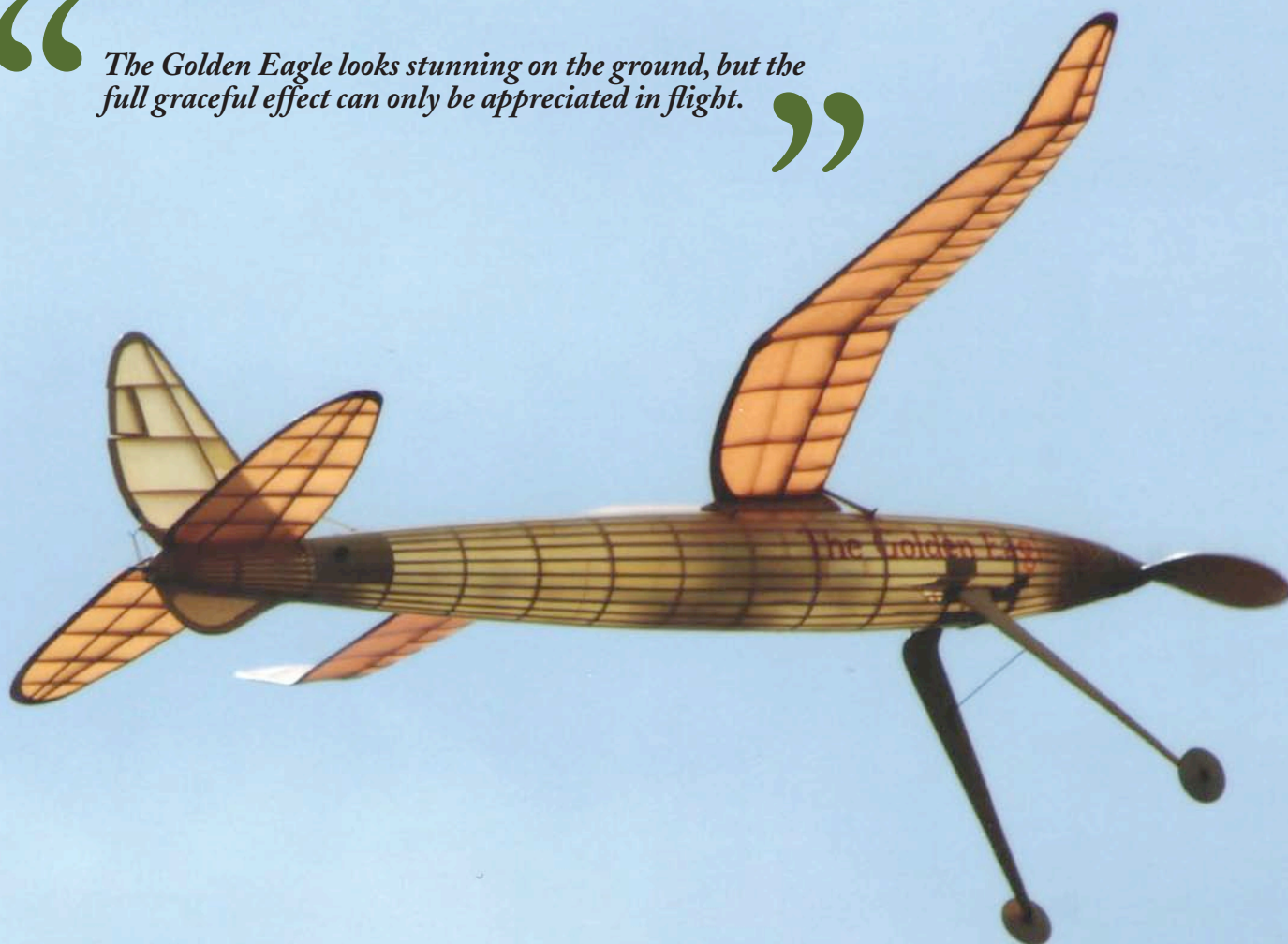
You will need to build a jig before constructing the fuselage. The balsa formers are wound round a central card core and allowed to dry before threading on the square section spindle.



The finished fuselage is strong yet light. You will need to sheet in between the stringers the areas of stress.



“*The Golden Eagle looks stunning on the ground, but the full graceful effect can only be appreciated in flight.*”





A wing jig ensures the final polyhedral is correct and no unwanted warps are introduced at joining or covering stage.

One of Keith's latest variations has an all sheeted fuselage similar to the original design. This gives a stronger finish but at a weight and performance penalty, so is not recommended. For the lightest model you would remove some material from the centre of the ribs.

4 layers for the nose and wing seating areas – pre-soak the balsa (in the bath!) to help with the curves. Cut out the central square hole in the card to suit the straight rod you will use as part of the jig. The cardboard temporary formers are removed after the stringing is complete, by carefully cutting in to the formers – choose your card wisely and possibly make some initial cuts to make later removal easier.

Frank Zaic's guideline plans show a sheeted fuselage. I opted for 3/32in. stringers attached to wound formers for most of my Golden Eagles apart from a later one with an all sheet fuselage which I initially built

as two half shells – but this came out too heavy. Taking the spacing from the plan, arrange the temporary cardboard formers with the finished laminated formers along the central rod using masking tape and small blobs of glue. When attaching the stringers, I first attached, using cyanoacrylate glue, four stringers equally spaced at 90 degrees (compass points if you like) to stabilise the structure, and then filled in the other stringers using PVA glue and masking tape with rubber bands to hold them in place. I recommend using sheet infill between the stringers in areas of high stress: the nose, around the undercarriage attachment, the top of fuselage

wing seating area, below the wing where your natural grip for launching is, and around the rear motor peg.

Wings

I opted for one piece wings with a central housing and 1/16 in sheet balsa ribs (skeletonised to save weight where practical). You may need to consider plug-in outer panels to the wing centre section if you will have problems with transporting a 55" wing in one piece.

A wing jig was made to hold the wing sections in place whilst gluing and also used when water shrinking and dopping the



Keep the rear end light and you will have a real floater on your hands – make sure the DT is fitted and used.



Clutch mechanism and nose block retainer used on the Golden Eagle.



Do use fill in sheeting on the fuselage in areas of stress such as where the wing pod sits, the undercarriage is restrained and where you grip the fuselage for launch.



Don Holder (left) has caught the Golden Eagle building bug from Keith Palmer – will you join them?

covering to prevent unwanted warps. It is also useful for storage between flying sessions.

Tailplane and Rudder

The design allows for the whole tailplane to tilt up by approximately 15 degrees for D.T. function.

Undercarriage

Although the model is light, the undercarriage and the attachment area are, as with many models, the items that seem to attract the most damage – the light wing loading and size makes the model prone to gusts sending it tumbling across the airfield while sitting on the ground. I use 'U' shape wire pegs near the wheels to hold the model while I'm not flying.

The undercarriage is a soldered wire frame with sheet balsa cladding – if you want to make things a little more robust I would recommend possibly having a layer of thin

plywood next to the main wire with a balsa sandwich either side. The wheels are shaped from a circular sandwich of ply/balsa.

Propeller Assembly and Motor

Propeller is a 'Garami' type freewheel clutch on a 20in x 26in pitch propeller. The motor, 16 strands of ¼ inch flat rubber made up into 44 in loops, braided with approx. 50 turns. Maximum turns 900.

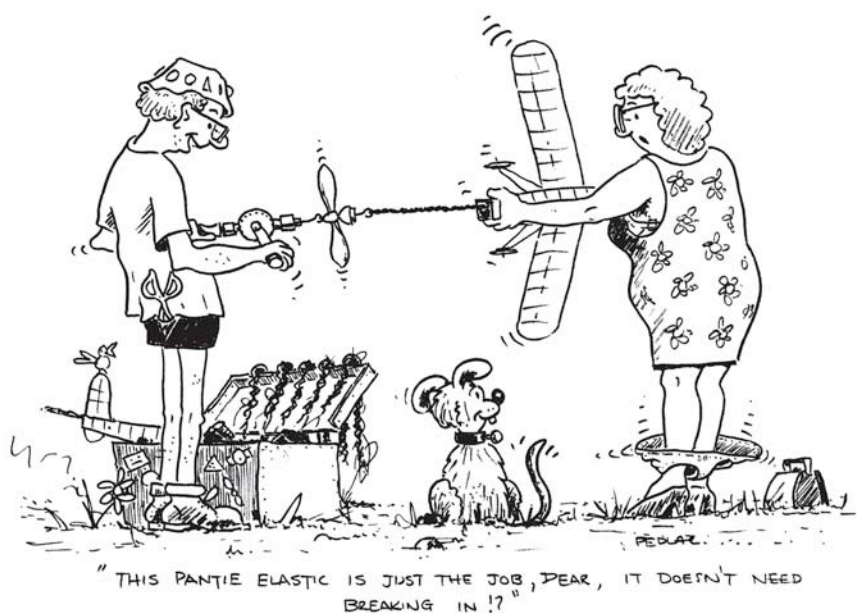
Trimming and Flying

A realistic finished weight for the model is around 14 oz including 4-5 oz of rubber. The

best weight yet for a 'competition' version was 11 ¼ oz.

It is probably advisable to have the model slightly nose heavy for its maiden power flight. You will require right side and down thrust. Set rudder tab to give right hand glide.

Good luck with this delightful looking model, and do come and say hello to me when you see me at Old Warden or Middle Wallop. I'll only be too pleased to show you one of my Golden Eagles and answer any questions. ●



Keith Palmer is a Vintage Rubber Duration enthusiast and part time cartoonist!

S

olarfilm

IRON-ON COVERING MATERIAL FOR FLYING MODELS

TO RECEIVE A SAMPLE PACK CONTAINING ALL PRODUCTS
& AVAILABLE COLOURS SEND FOUR FIRST CLASS STAMPS TO:-



Solarfilm Sales Ltd. Ackhurst Rd, Chorley, Lancs. PR7 1NH England
Website www.Solarfilm.co.uk Tel 01257267418 Fax 01257276203

Dens Model Supplies

Traditional and Electric CL/FF



E-Zee Timers *Electric CL and FF*

Cox 049 Engines from under £20...ECL kits from Stevens
Aeromodel....Motors & ESC's....Glow Plugs from Merlin....CL accessories

On Line shop at www.densmodelsupplies.co.uk
Or phone Den on 01983 294182 for traditional service



ROCKET PROPULSION AND THE AEROMODELLER

Part 1: Roger Simmonds, 'Mr Jetex', looks back at the history of rocket powered winged-model flight and how it has been reported between these covers.

.....

Introduction – The Early Years

Even when the AeroModeller (AM) was first launched, rocket propulsion had a venerable history, and was certainly taken seriously by many model aeronautical engineers, especially in Europe; some interesting and advanced designs were published in the 1930's Frank Zaic Yearbooks in the USA. Also, given its simplicity (no rubber motors needing expert handling, no heavy and complicated internal combustion engine) propelling model aircraft by a rocket was an attractive and exciting option, especially for the younger reader. So it was that one of the first AeroModeller free plans, in June 1939, was a simple all-balsa twin-boom design powered by a 'penny rocket'.

Then, as today, modifying 5th November Guy fireworks was illegal, but the designer, the gloriously-named J. R. Singer-Craigie blithely informs the reader, "As rocket mixtures are difficult and dangerous to prepare... I am recommending the ready-prepared type, which

may be bought at most toy shops for a penny. If however, you want something more elaborate, mind you are not served with the explosive type, as coloured stars are apt to be rather superfluous". The trimming instructions were less comprehensive, "Balance each wing tip on an empty bottle... light the touch paper and stand clear. If you have put the correct down thrust in the rocket, the plane will climb steeply to about fifty feet and pull out into a good flat, but rather fast, glide." I wonder how many were built and successfully flown, and how many prosecutions resulted?!

The War and Just After

The Second World War inevitably circumscribed modelling (and publishing), but AM reacted to these times admirably, publishing plans, reporting events (such as there were in those straightened times) and keeping an eye on developments in full-size aviation. Readers





Rocket Man! Roger Simmonds with his recreations of the 1950's Jetex Wren and Jetex Sharky, modified for Rapier L-1 and L-2 respectively.

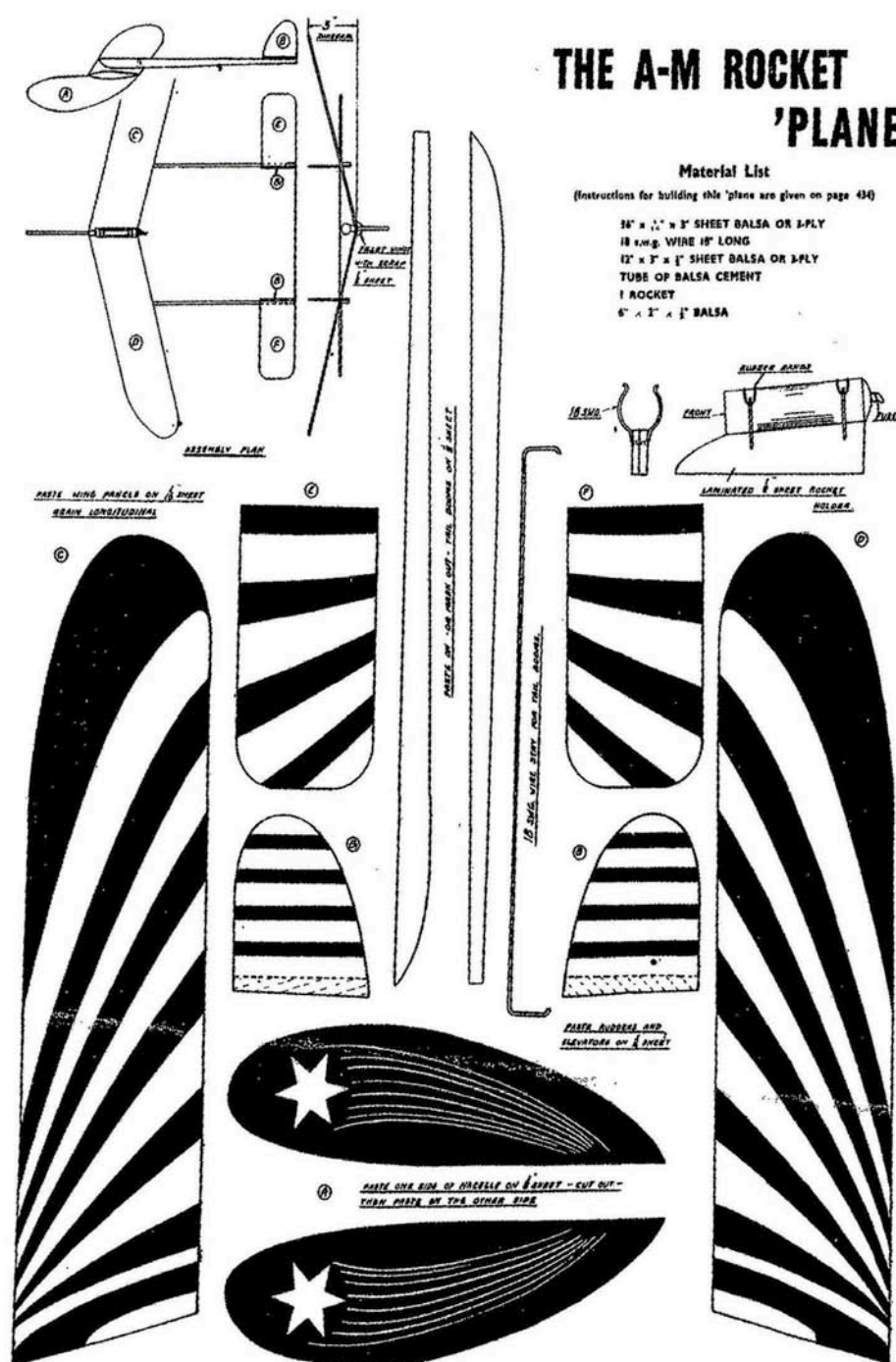
were kept up to date about jet propulsion and the new shapes taking to the skies. Laurence Sparey was at this time writing articles about rocket propelled models and even making motors filled with gunpowder, but this was ignored by AM's somewhat austere managing editor, Mr D. A. Russell. However, Howard Boys rocket-propelled 'Flaming Ptero' demonstrated at Eaton Bray could not be ignored.

There was, however, a headmasterly editorial, 'Rockets and the Law' (Nov 1945) which began, "The appearance of rocket-propelled aircraft at a national competition brings to the fore the important question of how constructors of such types stand with regard to the law. Mr A. F. Houlberg, chairman of the S.M.A.E., has been in touch with the authorities with a view to a clarification of the legal position... Mr Boys has now received a letter from the Explosives dept of the Home Office... which is of the opinion that there is no cause for interference [read prosecution] provided that the rockets used are made by a firm licensed under the Explosives act". Russell, ever mindful of his responsibilities, ends, "But, of course, the question of third party risk will remain". The plan for the innovative Flaming Ptero never appeared in the august pages of AM.

Nevertheless, AM published a plan for a rocket propelled model, 'Glirt' in November 1946, a reaction, at last, to Boys' experiments, and mirroring the change from piston engines to jet engines taking place in full size aviation.

The designer, P.A. Latham, makes little reference to his model's means of propulsion, though the plan clearly shows a bulky rocket motor nestling beneath the fuselage. Mr Latham was prudent enough to include an injunction not to "...use explosive rockets!"

Interestingly, the first advert for a rocket-propelled model appeared in the same issue of AM. Astral's "marvellous Rocket Plane", which was "now in production" is very similar to Latham's twin-boom Glirt, but the designer is given as one "Royston B. Selwyn". This might be a conflation of 'Boys, 'Towner'

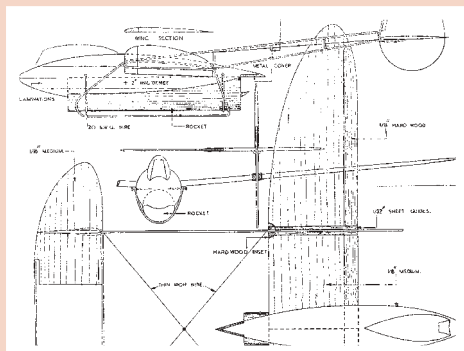


J R Singer-Craigie's 'Penny rocket' of 1939. All that this rather nice model needed was a sensible means of propulsion!

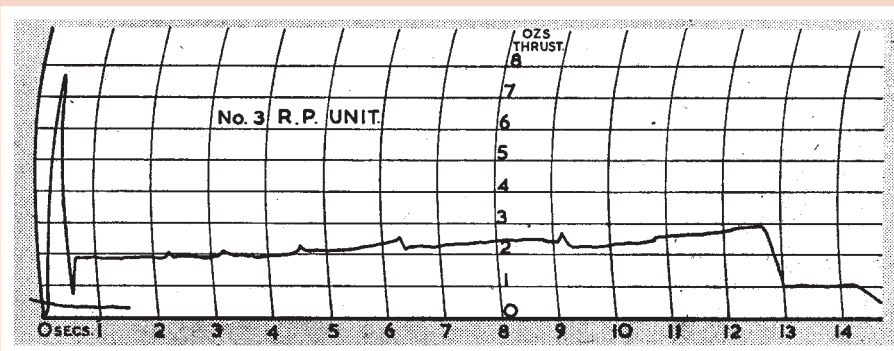
and 'Sparey', all AeroModeller contributors, so they could escape litigation! I again wonder how many of this kit, from a then well-respected manufacturer, were successfully made and flown.

The Astral advert boasts that the motors "have received official sanction" and "are now in production", so it would appear that the irrepressible Mr. Boys did indeed get his black powder motors manufactured by a firm licensed under the Explosives Act (Brocks, I believe) and Russell allowed publication of Boys' article, "Rocket Models" in July

1947 (Part of the Bonus Content on www.aeromodeller.com). This is still worth reading today, for example, the opening paragraph begins: "With every type of power unit there are advantages and disadvantages. With rockets the advantages seem to be absence of torque reaction, a large amount of thrust when required and no winding up or prop swinging or other manual effort, and the power unit does not suffer in crashes. Disadvantages are the heat of the efflux and the short duration of power. They are, however, great fun, and the model can always



The Vampire-like Glirt was obviously designed for one of Howard Boy's 'RP' units, but these are not specified by the designer.



Howard Boys 'RP' motors had an impressive performance but were not a commercial success.



The first advert in the AM for a rocket-propelled kit.

be flown as a glider without the rocket unit". These sentiments are as true today as when first penned. The article also included a rather better illustration of the Flaming Ptero in flight and, a first I think for any hobby magazine, a thrust-time graph of Boys' RP 1 and RP 3 units. These indicate why Boys was successful where others had failed. A thrust of 2.5oz for over twelve seconds from a black powder propellant is remarkable.

Strangely, Boys ground-breaking DH 108 never made it past the editor (it was eventually marketed by 'Powakits'). The article accompanying the first plan of a scale jet aeroplane AM published, A. J. Cockle's Vampire, gives no flying hints or details of the rocket motor, despite one being indicated on the plan. This might appear strange, but Brock's 'low thrust, long duration' motors, in contrast to their normal products, never achieved a level of reliability

necessary for a commercial product, nor it would appear, the approbation of AM's editor. But all this was to change eighteen months later with the introduction of Jetex.

The Launch of Jetex

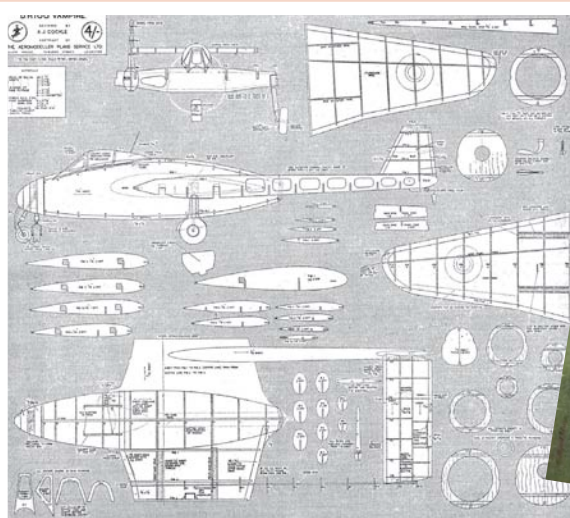
Jetex propulsion was the invention of Joe Mansour and John Wilmot, who had been with International Model Aircraft Ltd. (IMA - FROG) from the beginning, and had experience of designing and manufacturing rocket-propelled target and smoke-laying drones during the war. In contrast to Howard Boys' simple 'one shot' black powder cardboard-bodied units, Jetex motors had well engineered metal bodies and the propellant was guanidine nitrate based. The motors were designed in liaison with the L.S.A.R.A. (Low Speed Aerodynamic Research Association), and the propellant pellets were based on

ICI-Nobel's gas generating 'power cartridges'. ICI had high hopes for these intensively researched products, whose uses ranged from starting jet engines, powering underwater hammers, and yes, propelling toy aeroplanes. Thus it was that at their launch, in March 1948, many modelling luminaries, including AM's editors, were on the specially chartered flight to

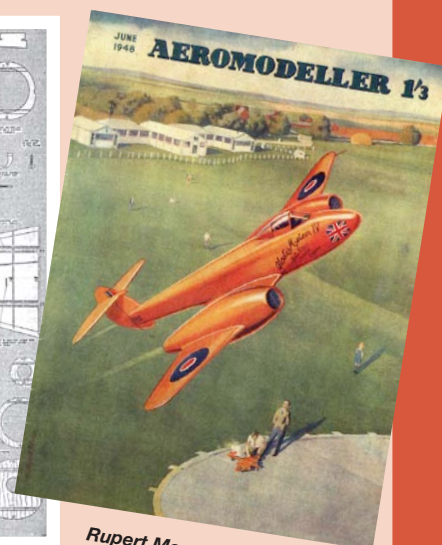


A more recent photo of Mike Ingram who was a Jetex employee, holding one of the rocket-propelled targets developed during WWII.

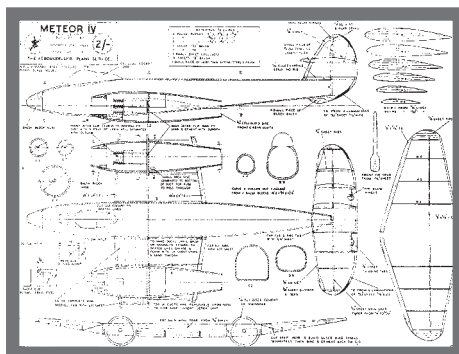
The impressive and iconic 'Flaming Ptero in glorious flight.



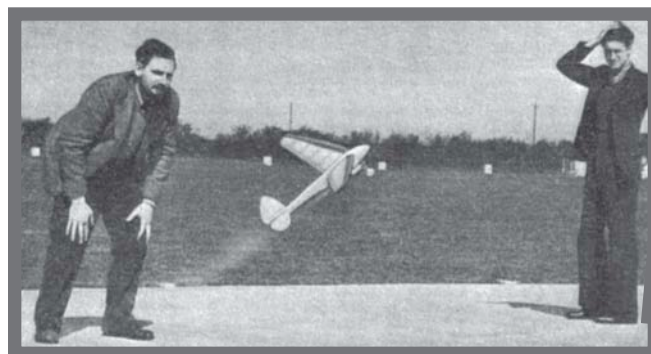
A. J. Cockle's superscale Vampire. Nice, but where is the means of propulsion?



Rupert Moore's wonderful June 1948 AM cover. There was not to be another cover featuring a Jetex model until 2001.



The Meteor's choice as a scale subject was timely, given its recent World Speed Record. But it was ambitious, and a how many were actually built (and flown) is not known. A photo of the model (presumably built by AM staff) was only published in 1953.



The Zephyr was a much more conventional design than the Meteor, but here is the proof that it had actually flown!



An early Jetex advert for the Jetex 50. Note that (apparently) the SMAE had at last approved this means of propulsion, and contests could begin!

Nobel's factory in Scotland.

They reported, in their May 1948 editorial, "We were privileged to see first demonstration of special propulsion units developed for use in model aircraft, cars and boats... we saw tailless aircraft make powered flights from twenty to thirty seconds. We understand that some while ago a firm was incorporated with a view to producing and distributing various sizes of units and fuel... an announcement will be made in the advertisement pages of our next issue". Despite the understated prose (and I have edited this prolix passage severely) the editor is excited and impressed, writing, "Our next issue will be something of a special 'jet' number for which an appropriate cover design has been executed by Mr Rupert C. Moore. Plans of special model aircraft will be described... We shall watch the introduction and future development of this latest invention with great interest and readers may rest assured that they will be kept right up to date with authentic information".

The worthy D. A. Russell (managing editor) and C. S. Rushbrooke (editor) were as good as their word, and Mr. C. Rupert Moore did indeed produce a stunning cover for the June 1948 edition of AM. Rushbrooke's alliteratively-titled editorial, "Pellet Power Possibilities" includes some perceptive comments, for example: "Rocket motors have been tried in place of jets in scale models, but have proved uncertain in operation, irregular in thrust, and even dangerously explosive". About the new Jetex motors he writes, "we are able to reveal that this work has been pioneered by Messrs. Wilmot Mansour Ltd., and our advertisement pages carry the first announcement of the power units which are now available" the basic operation of the Jetex motor is described, with the caveat, "while by no means a true 'jet' motor, it is nevertheless jet-like in operation, and overcomes most of the defects of alternatives available".

Whilst the article claims, "Considerable research work has been carried out by our

technical staff in conjunction with Wilmot Mansour Ltd., with a view to producing model aircraft suitable for use with these new units", (and it is noteworthy that Jetex collaborated with AM and not a rival magazine such as Model Aircraft), the two models the technical staff came up with, the Zephyr and Meteor, are curious in that the former is quite old fashioned and the latter, powered by not by one, but two Jetex 100 units which would have been beyond the average reader, and may have been too difficult at that time for even the expert AM staff. There are illustrations of the Zephyr being launched, but readers would have to wait for the 1953 AM Annual before they were allowed to see a photo of the overly ambitious Meteor.

Roger Simmonds continues the story of Jetex and beyond in the next issue of AeroModeller. ●



Wilmot Mansour's early models were unsophisticated. This advert is typical of the late 1940's.



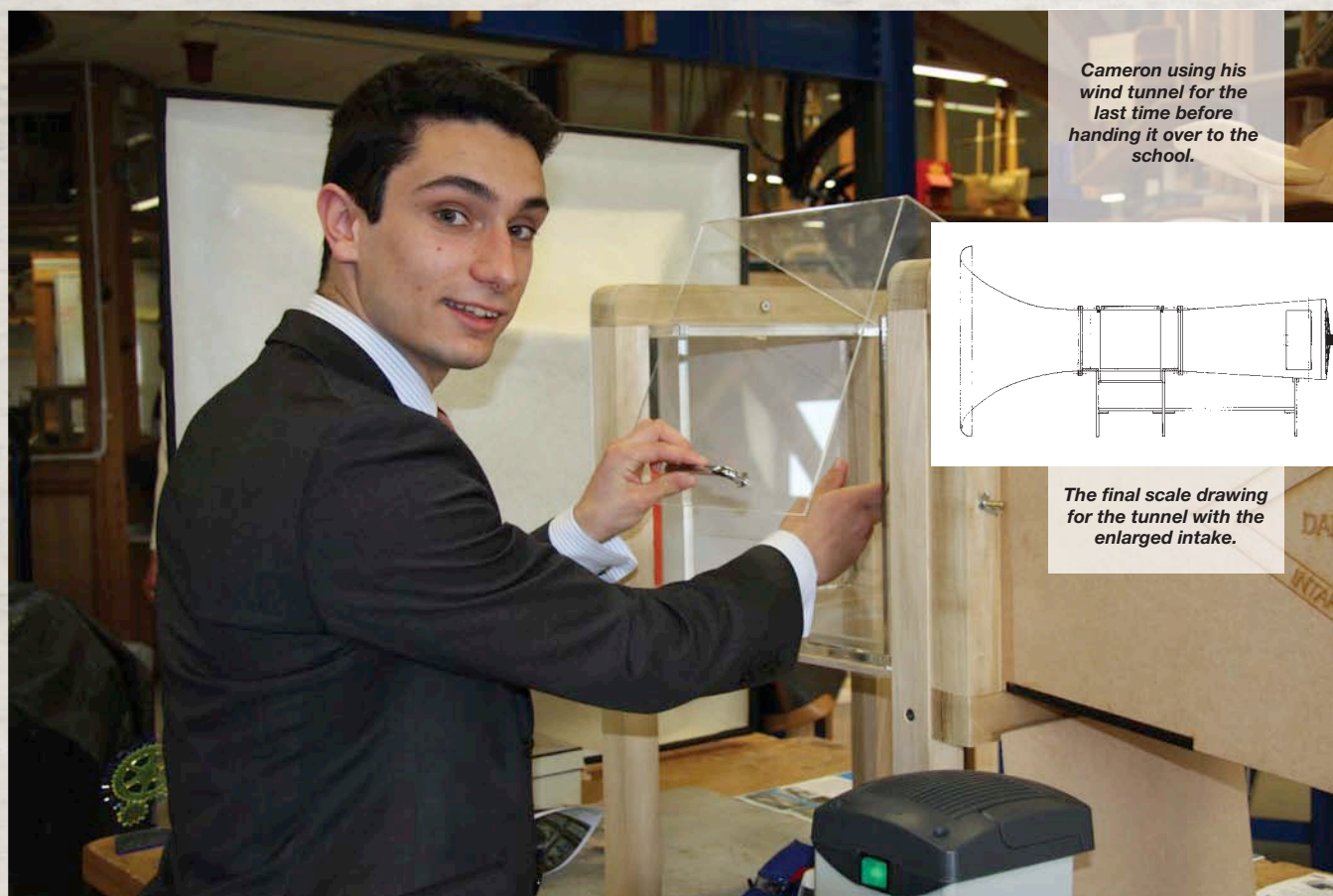
The development of Jetex was highly technical, as is shown by this thrust test rig being used by Peter Cock. (from Mike Ingram's Jetex Archive)



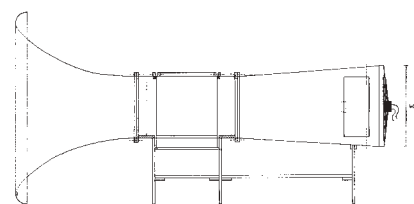
Later in production Jetex marketed the Jetmaster unit which could be used with an augmentor tube. (from Mike Ingram's Jetex Archive)



All sheet kits gave the beginner builder a chance of at least completing the model. Getting the model trimmed and a successful Jetex powered flight was another matter. (from Mike Ingram's Jetex Archive)



Cameron using his wind tunnel for the last time before handing it over to the school.



The final scale drawing for the tunnel with the enlarged intake.

BUILDING A WIND TUNNEL AT SCHOOL

We originally heard from Cameron Liddell-Grainger as an AS Level student in November 2014 *AeroModeller*. Now he updates us on his project for the final year of A' Level.

It has been over a year since I completed my XD 10 'Drone' for my AS Design Technology project. This year for my final A' Level project I needed something more challenging.

The possibility of building a wind tunnel had arisen in previous years, but the opportunity was never able to come to fruition due to the specifications of the projects I had to adhere to. However in

this final year it had to be more ambitious (within reason). So, I was given the go ahead for designing and building a wind tunnel.

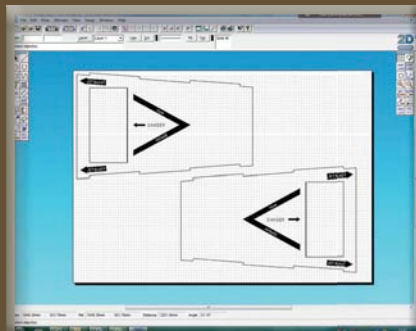
I arranged to have a meeting with the head of science and a physics master who had studied aeronautical engineering. I asked if they would be interested in having a wind tunnel for the department. They were very enthusiastic and agreed to help

fund the project; we then had a discussion about the general specifications and the basic physics I would need to consider when designing. We settled on a tunnel around two metres long with a testing section of 30cm³.

In my research, I found the variation in tunnel designs was surprisingly wide, coming in all shapes and sizes. There were two main types of tunnel, open and closed circuit.



Fixing a plywood panel to the mould of the intake with a staple gun.



A CAD screen shot showing the two sides of the exhaust.



Displaying the tunnel for the first time to the Head of Science.

Open circuits are the more conventional design, sucking air in one end and blowing it out the other. Closed circuits are a sealed unit which accelerates air to much higher speeds. However, they are much harder to engineer because the airflow has to pass evenly through the corners of the tunnel - I opted for an Open type.

Design and Development

I started with the construction of the mould for the fibreglass intake. This consisted of four laser cut formers designed in CAD to provide an exponential curve, covered with flexible plywood sheets to create the sides. The lips of the intake had been designed to curve backwards and were made from 110mm plastic drain pipe. The pipe sections could then be attached and the whole mould sanded smooth and have any gaps filled before coating it in a sealant. The release agent was then applied which gave the mould a hard, glossy finish and permitting the completed fibreglass piece to slide off. This would be the surface reproduced on the inside of the finished intake. The mould was then put aside, ready for fibre-glassing once the resin arrived.

The centre section where the testing would be done was built with a mixture of both modern laser cut acrylic sheet and more traditional wood work. It consisted of a clear acrylic box with a 'right angle door' and a pine frame which doubled as brackets to join with the intake and exhaust sections. The 12mm acrylic pieces were joined to the frame using counter sunk screws so that the heads would not protrude into the tunnel. The frame was made from lengths of 45mm x 45mm pine, each hand sawn and then sanded to the nearest 0.5mm. The 'right angle door' was formed from a 3mm piece of clear acrylic and line bent to produce the 90 degree bend.

The fibre-glassing was by far the most ambitious and expensive part of the

project. We decided that the intake should be made up of five layers, a gel coat (for a glossy inside surface), three layers of fibre-matting and a layer of roving (for a tidy, tough exterior). The first step was to cut up the fibre-matting which came as a big roll. By making a template of one side of the intake, I was able to cut out the 12 pieces of matting.

Working with the substance involved in fibre-glassing meant having to work outside and wear surgical gloves, an apron and a tight-fitting face mask with filter. The first gel coat was applied and left to dry overnight, however, due to the ambient temperature of the storage room, the gel had simply peeled off. So after peeling off the leftovers, we applied another gel coat which took. The first layer of matting could then be put on with the resin which had to be mixed with a hardener in accurate ratios. Over the course of several days, the twelve sides of matting had been put on with a few litres of resin. Unfortunately time was getting short and I still had the exhaust section to build, so the roving layer was applied. A couple of days later, after the resin had had plenty of time to dry, it was time to remove the mould. As I had been told to expect, the mould did not simply slide out, in the end we totally destroyed it to reveal the glossy perfection inside! I could not be more pleased with how the intake turned out and it really looked the part.

The final section was the exhaust which was designed to be as simple as possible and could quickly be modified in CAD and reproduced to accommodate different diameter fans. The four tapering panels were laser cut from MDF and had rectangles cut out towards the back-end to make vents in front of the fan so small adjustments could be made to the internal airspeed. I also had warning symbols from aircraft etched onto the side showing vents and direction of 'Jet Blast'. The power unit that I decided to use was a

generic 16" car radiator fan with curved blades.

Testing the Tunnel

The last stage of the project was to test the functionality and performance of the tunnel. First I measured the airspeeds using an anemometer at various locations through the tunnel several times at a constant rpm generated by the fan. The readings remained consistent for each location - showing good, stable airflow. I managed to achieve airflow velocities of over 20mph. Another test I tried was sticking strips of post-it notes on the inside of the intake to show any areas of turbulence.

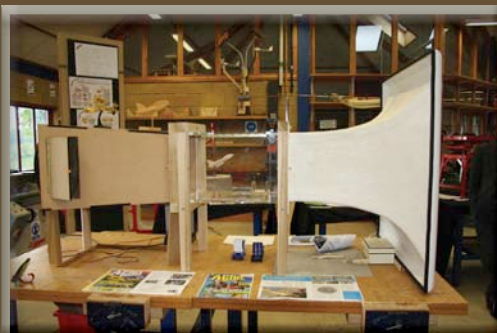
Finally, to show the wind tunnel off during 'Founder's Day' where parents and guests view students' work, I made three simple balsa model planes which I flew inside the tunnel, providing much interest and discussion.

I hope that many future students will gain valuable insight into aeronautical design and experimentation from the wind tunnel which I left to Lancing College Physics and Design Technology Departments. I am pleased to have been able to leave my mark within my favourite departments!

So was all this hardwork worth it? I won the first place A' Level prize and got an 'A' in Design Technology for the Wind Tunnel. With my other A' Level results I have also been accepted into Kingston University to study Aerospace Engineering.

Thanks go to the Lancing College Physics Department and AeroModeller for providing the funds for this project. My greatest thanks have to go to the Design Technology Department and its staff, especially Mr. Coakes, without whom this project would not have been possible.

I'm sure all the readers will wish Cameron success on his Aerospace course at Kingston University which owes its roots to the Sopwith Company - the Editor. ●



The intake with strips to indicate the rate of airflow.

A full length side view of the completed tunnel.

My Design Technology A' Level prize.

FF WORLD CUP DUO AT SALISBURY PLAIN

Mike Evatt reports on 'The Stonehenge Cup' and 'The Equinox Cup' on the 26th & 27th September 2015.



Alan Jack launches into the sunset in the F1C fly-off.

As happened last year, owing to military requirements the Stonehenge Cup traditionally held in early May had to be postponed - once again competitors enjoyed both the Stonehenge Cup and the Equinox Cup run as single day events back-to-back over one weekend. And once again, as in 2014, timekeepers were not provided so other flyers and helpers were pressed into service. Given the landscape of Salisbury Plain, the timekeepers were briefed that they could move after launch to allow better observation of the flight over the undulating terrain.

Stonehenge Cup

Saturday dawned pleasantly warm for the time of year and with a very light easterly breeze. Flight lines were positioned some way from the car parking area but it soon became clear that a move upwind would be required as the increasing drift was taking models close the downwind trees.

This worked well until the last of the five rounds when it was decided that the maximum should be increased from three to four minutes. This had the CD's desired effect that the fly-off numbers were reduced but it did leave a number of models in the trees!

There were fly-offs in all classes except F1Q Electric Power. Five individuals were clear in F1A Glider, six in F1B Rubber and four in F1C Power.

With a glorious sunset as a backdrop the fly-offs were made in fast cooling air and fading light.

In F1A John Williams took the title for the second year running with an excellent



Bill College gets a good indication of where it should go.



A good win for Mickael Rigault in Equinox F1B.



Peter Brown bends over backwards in F1B.



Jean Claude Cheneau bides his time in F1B.



An excellent launch for Jean Pierre Challine's F1A.



Top spot at Stonehenge for Trevor Grey in F1Q Electric Power.



Neil Allen prepares for the F1C fly-off for the Stonehenge Cup.

flight of nearly six minutes which unfortunately landed in a tree, followed by Boris Bernard and Jean-Pierre Challine of France.

Mike Woolner just edged out Peter Brown to take top honours in F1B. Third place was tied between Didier Barbaris and the very good junior Maxime Tisserond.

Neil Allen flew well in the fading light to beat Alan Jack by twenty seconds with Adrian Peters a minute or so behind in third.

Following the increased activity in electric power it had been expected that there would be more entries in F1Q. This was not the case and just as last year, Trevor Grey won the event from Peter Watson and Ian Kaynes.

Equinox Cup

Sunday was the turn of the Equinox Cup. Once more the day dawned bright and dry but there was more movement in the air. Round One was halted halfway through as models were reaching the distant tree line driven by the increasing brisk breeze. After much deliberation the flight-line was moved about half a mile up wind, and the round restarted. This improved matters somewhat although it did mean that models were overflying the adjacent road. As it happened it wasn't a great problem as the road was partially closed for repairs.

The upshot of these delays was that the contest was reduced to four rounds in order to complete any fly-offs in reasonable light.

Once again fly-offs were necessary in all but F1Q electric power. Congratulations are due to John Williams who made it a double celebration by winning the Equinox F1A glider from Bernard Trachez and Richard Jack. Jean-Pierre Challine had to dash for the ferry and so could not improve on his fourth position.

In F1B last year's runner up Mickael Rigault of France took top spot closely followed by Jean-Claude Cheneau and Richard Nouvian. French junior Maxime Tisserond had another good day, adding a fourth place to her third of the previous day.

The three way fly-off in F1C power was very tense. Only twenty seconds spanned the contestants. Alan Jack was just six seconds ahead of Mick Lester with Neil Allen a further fourteen seconds behind him.

In F1Q electric power Ian Kaynes came in first followed by Trevor Grey and Peter Watson.

All things being considered, the combined weekend worked well although things might have turned out quite differently had the weather not been as kind.

The Contest Director throughout the weekend was FFTC member John Carter who should be congratulated for running a tight ship, taking difficult decisions when appropriate and giving clear and unambiguous announcements. However given the number of French competitors perhaps a translation would have been in order. ●

Results:

Stonehenge Cup
F1A 24 flew 5 full scores
1 J Williams GBR 960 +358
2 B Bernard FRA 960 +202
3 J-P Challine FRA 960 +161
4 M Cook GBR 960 +11
5 J Cooper GBR 960 +0

F1B 19 flew 6 full scores
1 M Woolner GBR 960 +331
2 P Brown GBR 960 +328
3= Didier Barbaris FRA 960 +310
3= M Tisserond (J) FRA 960 +310
5 D Greaves GBR 960 +252

F1C 6 flew 4 full scores
1 N Allen GBR 960 +413
2 A Jack GBR 960 +393
3 A Peters GBR 960 +316

F1Q 3 flew 1 full score
1 T Grey GBR 960
2 P Watson GBR 905

Equinox Cup

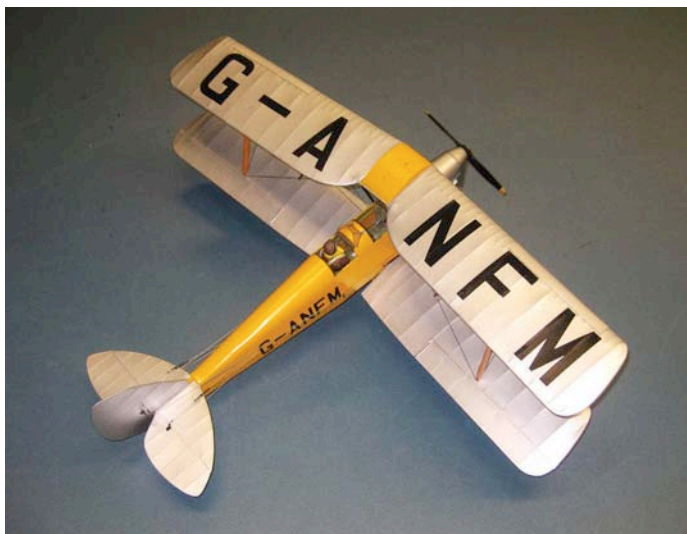
F1A 18 flew 4 full scores
1 J Williams GBR 780 +328
2 B Trachez FRA 780 +273
3 R Jack GBR 780 +178
4 J-P Challine FRA 780 +0

F1B 16 flew 7 full scores
1 M Rigault FRA 780 +347
2 J-C Cheneau FRA 780 +339
3 R Nouvion FRA 780 +334
4 M Tisserond (J) FRA 780 +309

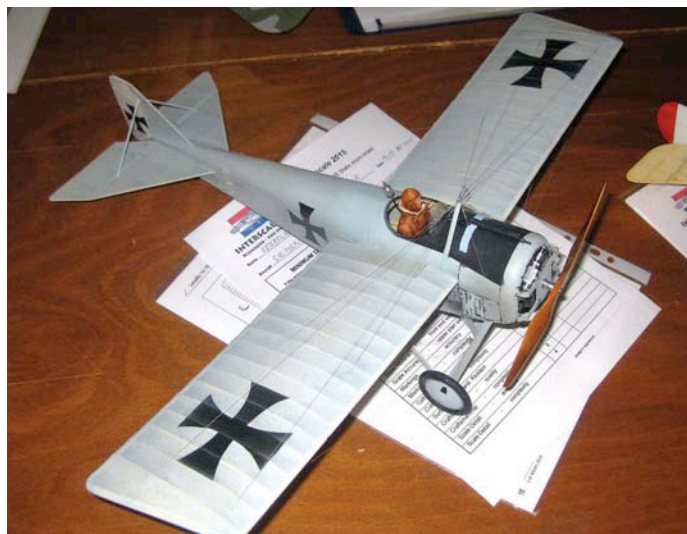
F1C 4 flew 3 full scores
1 A Jack GBR 960 +420
2 M Lester GBR 960 +419

F1Q 3 flew
1 T Grey GBR 721
2 I Kaynes GBR 681

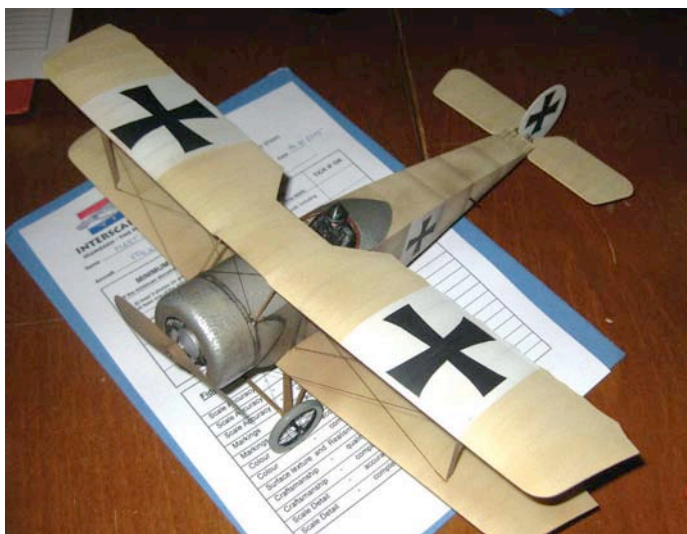
28 AeroModeller - February 2016



Derek Knight said he had spent weeks rushing to finish this new Tiger Moth but you wouldn't have known – it is as immaculate as ever and eventually flew well. Even has nuts and bolts on the control horns.



Michal Krapelska was a very prolific entrant – this is his CO2 Siemens EI. There were a welcome number of CO2-powered models being flown



Another of Krapelska's models was this rubber powered beautiful Fokker BII, with some very unusual engine turning on the cowl and panels.



George Kandylikis trimmed his DH9 under radio control, and then turned it off!

Shortly thereafter I received an email from Richard Riding, telling me that his father Eddie knew Jean Naylor well and also that he was still in touch with her son Edwin. Blow me down if Edwin did not contact me with photos of a static model of BYP in his possession that his father had commissioned, and finished in the same paint!

Anyway, I also had the Avetek Tiger Moth as featured in a recent review, and certainly sufficiently accurate in outline for Open, and the Peanut Halberstadt DII. A trip up to the indoor meeting at the Manchester velodrome saw them all flying fairly well, so all that remained was to prepare documentation and motors. The Puss Moth needed a great lump of plasticene, the Tiger none. Why am I telling you this? Read on.

The Event

Getting to Nijmegen couldn't have been easier. We drove off the boat and essentially it was two left turns and one right in the 70 miles to the town. Then it was another hour driving around to find the hotel. If they had

said it was on the only hillock in Holland, we'd have got there much more quickly. Very nice it was too, despite my misgivings at the picture on the website of an oompah band playing in the garden.

The hall was superb; even the walls were padded. I find it hard to gauge these things but it seemed bigger than Nottingham. Two complete walls were taken up by modellers' tables, and I think the organisers were taken aback by the numbers attending from all over Europe. Naturally there were many new models to be seen and the standard was stunning. I found a table in a dim corner and set up my feeble offerings.

I am certainly not going to give a blow-by-blow account, but I will try to give a flavour of proceedings. As I have said, there were a lot of entries, with many Peanuts and Pistachios, and close to thirty in Open Rubber. Kit Scale was a little more sparse than we are used to in the UK, while it was good to see several CO2-powered models. With multiple entries allowed, I feared that it would not all be fitted in, but it was,

helped by the flexible organisation and the preparedness of the modellers.

I had come with no targets other than to qualify, not keep the flight judges waiting and not to stand around in the middle of the hall waiting to be flown into. Thus as soon as I was ready, I had a few test flights. Strangely, the Puss Moth stalled as if the CG was behind the wing, while the Tiger hurtled across the floor with its nose down and tail in the air, clipping its prop to boot. Yes, I had converted the plasticene into lead and then glued it into the wrong model...

Anyway, back to those who knew what they were doing. Some well-known faces (and models) were showing us why they had gained their reputations. I knew why their models flew so well – they are lightly-loaded – but the mystery is how they combine this with perfection in finish and detailing. If I remove my glasses, I can focus at six inches, but even this could reveal no flaws in the models of the likes of Alfery, Kandylikis and Krepelsky. I did my best with the photos, given that I was up to my neck in it getting

Free Flight Scale

Another masterpiece by Robert Pajas was this Fairey Flycatcher – a difficult subject as I know to my cost



my models to qualify. If you want to see more, including videos, put 'Interscale 2015' in to a search engine.

I will mention just a few performances. Pete Fardell produced his new and largely untried Antoinette, complete with Hubert Latham in flat cap and Gauloise in hand. Eventually he got it to qualify with a very nice flight from this tricky subject. I particularly enjoyed the flights of Robert Pajas' models, which were strikingly slow due to light wing

loading, as were the Pfalz and Vimy of Tonda Alfery.

The schedule was very similar to that with which we are familiar in the UK, including, surprisingly, gliders, as well as the traditional pylon race which was won by Tim Horne and Pete Fardell.

On the Saturday evening we all decamped a short distance to the Nijmegen model clubhouse for a convivial evening. Yes, a proper clubhouse where models are built, just

like something from a 1950s 'Club News' in AeroModeller. I got the impression that the average age of modellers in Holland was somewhat lower than ours, and that aeromodelling is accorded a little more respect from authorities.

All Too Soon, it was Over...

The closing ceremony and prize giving was preceded by a moving few words from Andre Petit following the horrific events in Paris



The static judges had a long weekend; here we see just a few of the 50 or so Open models



A close-up of Alfery's electric Vimy which had a near-perfect flight pattern



Maestro Tonda Alfery had plenty of models, all beautifully made and fine-flying, albeit with lashings of dihedral; an immaculate Pfalz D.III, fully painted, sheeted fuselage (no stringers) and very light.

the Friday before. Then Roel Lucassen took over to hand out the hardware. Roel is a very charismatic organiser – never flustered and always in control of things, ready to make changes to the timetable where appropriate. He was supported by a large group of helpers to keep things running smoothly, which they did. In particular I felt for the judges, who



Pete Fardell has spent a lot of time researching and building this Antoinette and was rewarded with a qualifying flight in the end. **Hubert Latham** sits there, pointing at Dover.



Just a few of the Peanut models entered.

Results – Full results in Bonus Content on www.aeromodeller.com

F4D Open Rubber – 28 Entries

| Competitor | Model | Static Score | Flying Score | Total |
|-------------------|------------------|--------------|--------------|-------|
| 1 Andre Petit | Southern Martlet | 2214 | 2003 | 4217 |
| 2 Antonin Alfery | Pfalz D.IIIA | 2040 | 2055 | 4095 |
| 3 Michal Krepelka | Bristol M1C | 1908 | 1885 | 3793 |
| 4 Mike Hadland | Stampe SV4-C | 2244 | 1481 | 3725 |
| 5 Michal Krepelka | Nieuport 11 1914 | 1590 | 3504 | |

Best Placed Junior

| | | | | |
|---------------|--------------|-----|------|------|
| Mirdin Brinks | Curtiss P-6E | 207 | 1098 | 1305 |
|---------------|--------------|-----|------|------|

F4E Electric/CO2 – 14 Entries

| Competitor | Model | Static Score | Flying Score | Total |
|---------------------|-------------------|--------------|--------------|-------|
| 1 Martin Huk | Morane Saulnier L | 2466 | 1785 | 4251 |
| 2 George Kandykakis | D.H. 9A | 2280 | 1941 | 4221 |
| 3 Antonin Alfery | Vickers Vimy | 2112 | 1674 | 3786 |

F4F Peanut – 34 Entries

| Competitor | Model | Static Score, Place | Fly Score, Place | Total |
|--------------------|--------------------|---------------------|------------------|-------|
| 1 Antonin Alfery | P-51H Mustang | 109, 8 | 175, 2 | 10 |
| 2 Antonin Alfery | Heinkel HE-70G | 106, 9 | 178, 1 | 10 |
| 3 Mike Hadland | Bucker Jungmann CC | 134, 2 | 118, 10 | 12 |
| 4 Mike Hadland | Bucker Jungmann BM | 133, 3 | 113, 13 | 16 |
| 5 Martin Huk | KI-43 Oscar | 112, 7 | 120, 9 | 16 |
| 6 Jacques Cartigny | Me 109 Trop | 118, 6 | 95, 16 | 22 |

Pistachio – 20 Entries

| Competitor | Model | Static Score, Place | Fly Score, Place | Total |
|------------------------------------|----------------------|---------------------|------------------|-------|
| 1 Antonin Alfery | King Fisher | 60, 6 | 142, 1 | 7 |
| 2 Lars Tolkstam | Udet U-12b Flamingo | 61, 5 | 103, 4 | 9 |
| 3 Enrique Maltz (proxy Kandykakis) | Santos Dumont 14 bis | 60, 6 | 112, 3 | 9 |
| 4 Martin Huk | Fly Baby Biplane | 56, 8 | 96, 6 | 14 |

Indoor Scale Glider – 7 Entries

| Competitor | Model | Flight 1 | Flight 2 | Flight 3 | Best Flight |
|-------------------|-------------|----------|----------|----------|-------------|
| 1 Peter Smart | Willow Wren | 1508 | 1246 | 694 | 1508 |
| 2 Vincent Merlijn | Nimbus 4 | 1380 | 796 | 1340 | 1380 |

Kit Scale – 15 Entries

| Competitor | Model | Static Score | Flying Score | Total |
|-----------------|----------------|--------------|--------------|-------|
| 1 Roman Groener | Piper Vagabond | 78 | 192 | 270 |
| 2 Peter Boys | Waco SRE | 80 | 162 | 242 |
| 3 Roman Groener | SE5A | 70 | 148 | 218 |

Profile Scale – 4 Entries. Winner Tim Horne with Chambermaid.

Best of Show - Roman Groener with a Piper Vagabond.

were hard at it for the entire weekend; I think two of them worked through all fifty-or-so Rubber and CO2/electric models, and that is too much by any standard.

This was a highly successful and enjoyable event, but what struck me even more was the unwavering friendliness and helpfulness of all the Dutch people that we met. It was

extraordinary to hear everyone in a restaurant or pub say 'goodbye' as we left!

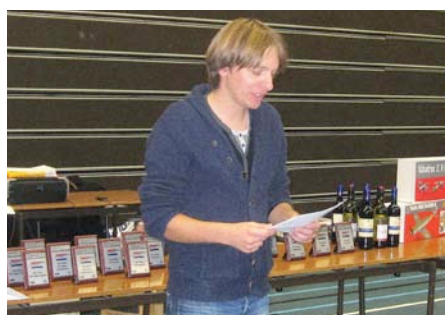
There will be another event at Nijmegen next November, the International Indoor Fly-in (check www.iifl.nl) which will also feature duration events. I would definitely recommend going, but would also recommend to start preparing now! ●



Dave Prior's Firefly was finished to a very high standard.



There were a few glider entries; this one had an impossibly high aspect-ratio balsa wing and astounding performance.



With a large entry of scale flyers, event organiser **Roel Lucassen** did a great job to keep things moving.



One of **Robert Pajas'** many models was this Fokker Universal.

THE CAPACITOR CUB

FRED BURMAN LOOKS AT SUPER CAPACITORS AS A POWER SOURCE FOR SMALL FREE FLIGHT AEROPLANES AND SHARES HIS PLAN FOR A PROFILE PIPER CUB.

Hearing about the availability of 'Toy Planes' powered by capacitors, I was intrigued and started to investigate the concept. I bought one of these toys (aren't all our models toys?) and gave it a few flights. The design of the launching and charging system is quite ingenious, but the flights were quite short and the aerodynamics

of the aeroplane were marginal to say the least - so I thought it wouldn't be difficult to design something better.

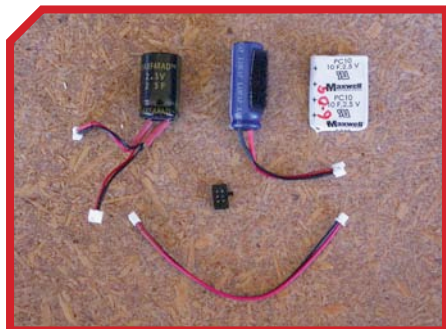
Super capacitors are sold in a range of capacities and a few were bought to test their practicality as power sources for small free flight models; tests were done and the results convinced me that this was a definite alternative to rubber motors for both indoor and fair weather outdoor flying.

What are the advantages of using capacitors instead of rubber? I think the main one is convenience - they can be charged quickly to give various levels of performance and flight durations with a small battery pack carried in your pocket. Also, they are compact and easy to install as well as being comparatively light. No lubricants are needed, as with rubber, so the model stays clean. The relatively large propellers required by rubber are not needed with capacitors, giving a better



A commercial 'Toy' capacitor plane - fun for kids but I wanted something with better looks and performance.





Super capacitors come in various shapes and sizes. Use very light connectors and switches.



Some motor/props tested. The two on the right, mentioned in the text, were the best.



The power (fuel?) supply, a switched battery box holding three AA or AAA alkaline batteries.



Two part balsa mould, ready to insert Depron wing blanks. The balsa framing strips are to prevent excess heat distorting the edges of the wing.



Taped up mould, ready to bake in the oven at 100°C for 20 minutes. Do not leave unattended. Wait for everything to cool before opening mould.

visual effect, especially on scale models. Their power delivery is similar to rubber varying from maximum at the start and reducing as the capacitor is discharged.

Experimentation with Components

After some experiments I found a combination of components and aircraft types that work quite well. Looking at some of the small indoor ARF's, such as the ParkZone micro Cessna and Citabria, they use a single LiPo cell for power, nominally 3.7 V, and a geared motor/prop combination designed for this voltage. They weigh about 20 grams with battery and have a wingspan of around 450 mm. Using this as a basis I designed a Depron 'Piper Cub' powered by a 10F super capacitor and using a ParkZone Cessna motor/propeller for propulsion.

Charging the capacitor with two AA size alkaline batteries resulted in a sluggish performance, barely sustaining flight. When I increased the charge voltage to three battery cells, 4.5 Volts, the performance was much better and I had to limit the charge time

to under thirty seconds to avoid a flyaway. Incidentally, the capacitors I have used have a rating of 2.7V so charging them to voltages above this would probably shorten their lives, but as they are cheap I don't see this as a problem. I have used 'super capacitors', as they are termed, ranging in capacity from 10 Farads to 25 Farads. There is little difference in weight between those capacities, being in a range of seven to nine grams, but there is some difference in physical sizes and shapes, such as cylindrical or rectangular packages. The components need to be joined by soldering small connectors to them so the battery can be plugged in to the capacitor for charging. A switch in the charging circuit makes for easier launching, but all added connectors and switches should be as light as possible.

Be aware that these capacitors are polarized, like batteries, and must not be reverse connected to the battery when charged. There are usually markings on them indicating the positive and negative poles, or just the negative one. Ideally you should design your charging system so

that it is impossible to charge the capacitor 'backwards'.

A source of super capacitors in the UK is Maplin (www.maplin.co.uk), and battery holders for three AA or AAA alkaline batteries can also be bought there or on eBay (isn't everything on eBay now?) Battery boxes or holders are also available with built in switches and these are ideal as chargers. The lightest connectors I have found are Micro JST (Product ID: MINI JST-EXT5) ones from HobbyKing (www.hobbyking.com). These come in packs of five and are already attached to wires which can be cut and soldered to the other components i.e. motor and capacitor. If you have a Parkzone Cessna or similar ARF which is past its use by date but has a working motor/ prop, this can be recycled as the propulsion unit. Alternatively, HobbyKing has a range of small geared motors (Product ID: GPS6) which work well at the specified voltage and have output shafts which fit small GWS propellers, also sold by HK. I have tested a few other types of motor and prop, but found the ones mentioned seemed to have the best power to weight



Permanent markers can brighten up the basic airframe.



'Pusher' configuration protects the propeller. Added dethermalizer might have saved this model!

ratios for this purpose.

Kit makers such as Dumas (www.dumasproducts.com, UK distributor www.jperkins.com) sell a wide variety of small rubber powered free flight models of suitable size which could be adapted to capacitor power. For the creative modeller there are many possibilities to design their own masterpiece. Some of the plans published in AeroModeller, new and old, are also suitable for conversion.

Building the Piper Cub

Building this model is very straightforward and all the basic information is shown on the plan. I will just add a few comments which may help some builders not familiar with

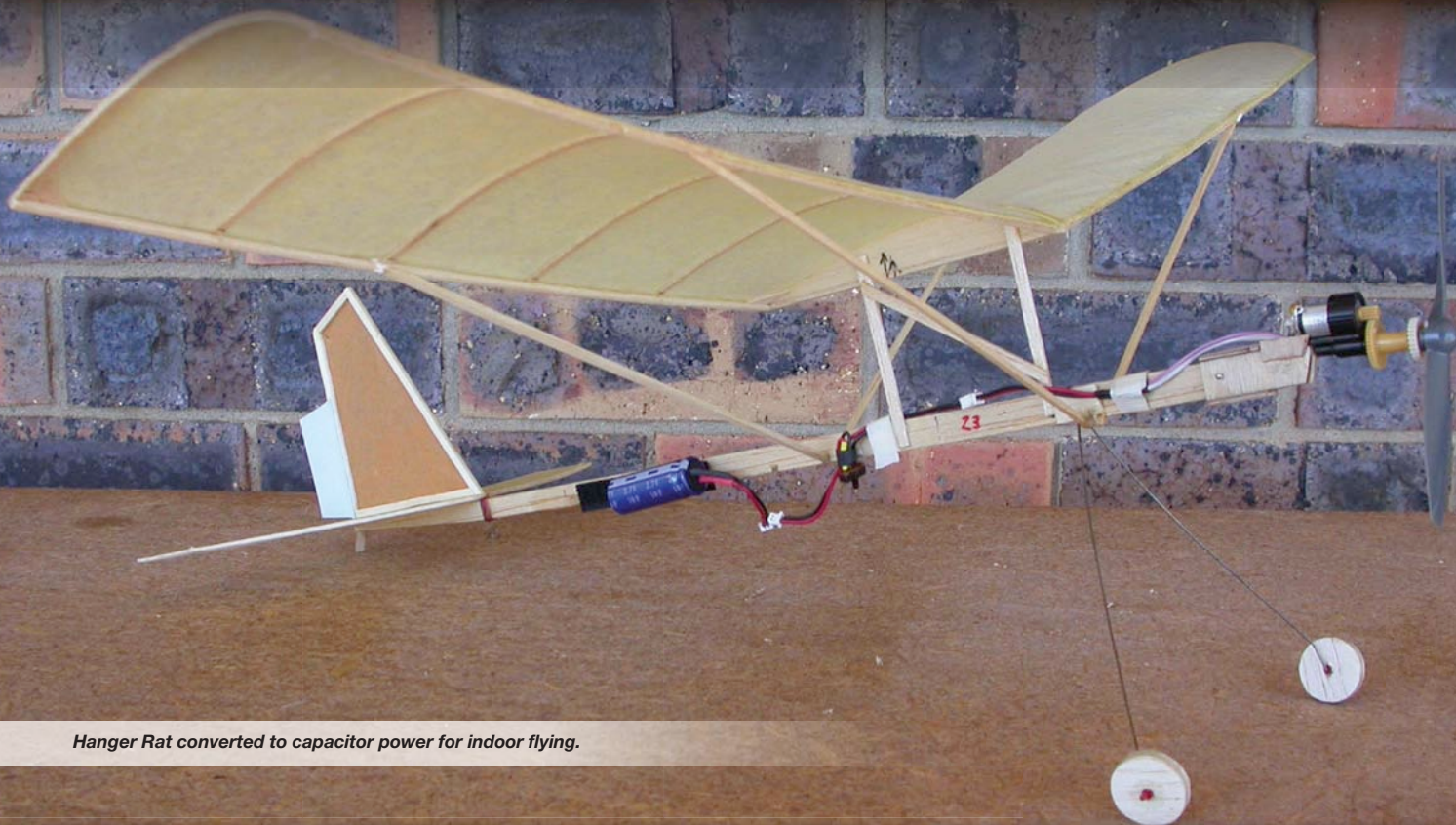
using Depron to build airframes.

The adhesive I recommend to glue Depron is 'Weldbond'. It glues wood, plastic and other materials and dries clear and stays slightly flexible. To form the wings to a curved aerofoil shape there are several methods which I have heard of but not tried myself. One is to make small grooves or scores in the wings lengthwise and then bend the wing into shape along these. The method I use is to form the curve on a mould heated in the oven, preferably when your partner is not in the vicinity. The photos should explain the method, and with the oven pre-heated to a hundred degrees celsius, a twenty minute 'baking' should be enough. After removing from the oven allow the mould to completely

cool before removing the Depron. Cutting the Depron to the plan shapes is easier if a card board template is made of each part to mark it out. One of the things I like about using this material is that it can easily be decorated in various colours and designs with permanent marking pens.

When you are ready to fly a capacitor model, do the usual hand launching over long grass (if you can find some!) unpowered. Preferably adjust the C of G by moving the capacitor to get the best glide. When satisfied with the trim do a powered flight starting with a short charge, say about ten seconds. Adjust the rudder so that it flies in a circular pattern, but does not spiral into the ground. After this you can gradually increase the charge time for longer flights. I have to warn you, from my own experience, about thermals. One of my models, similar to the 'pusher' in the photo, was taken to our club field for its first test flight. After giving it a short charge I launched it straight into a thermal which grabbed it and took it out of sight very quickly. In future I will use a dethermaliser when the conditions seem to require it!

With a few sheets of Depron you can let your design imagination run wild and have a go at something truly outrageous – do send in photos to AeroModeller of your capacitor plane experiments. ●



Hanger Rat converted to capacitor power for indoor flying.

35 mm. dihedral under both wing tips.

PLAN No. 614
Free with AeroModeller
945 Feb 2016

WING PANEL

2 mm. Depron

1 mm. dia. carbon fibre rod to l.e.

163°
1 mm. ply joiner glued to C.F. rods.

WING L.E. BRACE
1mm.dia. carbon rods glued or taped to l.e.

FIN

2 mm. Depron

cut rudder here

groove rudder along this line to allow bending.

approx. CofG position.

0.4 mm. ply doublers

both sides of fuselage.

FUSELAGE

6 mm. Depron

toothpick wing retainer.

toothpick tailskid glued into Depron.

motor - note downthrust, mount opposite side to capacitor.

velcro to attach capacitor.

1 mm. undercarriage wire thread bound to ply.

AIRFOIL SECTION

HORIZONTAL

2 mm. Depron

STABILIZER

2mm. x2mm.Depren reinforcing strips on top.

Making a Piston and Contra-Piston

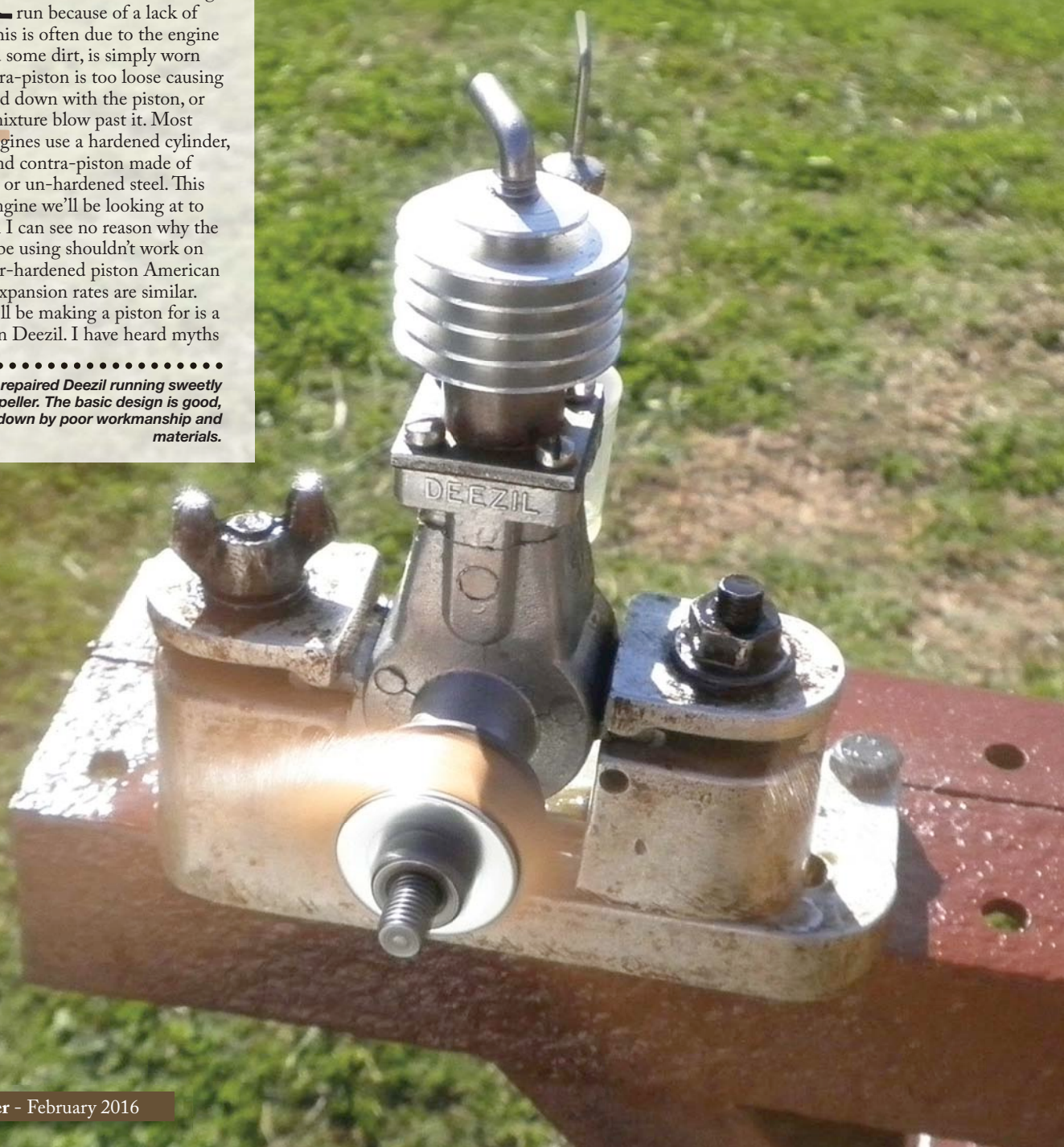
Allan Joyce gives step by step instructions for the lathe work required to make replacement simple piston assemblies.

Most modellers will have at least one engine sitting in a drawer or on a shelf in the shed that will no longer run because of a lack of compression. This is often due to the engine having ingested some dirt, is simply worn out, or the contra-piston is too loose causing it to float up and down with the piston, or lets the firing mixture blow past it. Most model diesel engines use a hardened cylinder, with a piston and contra-piston made of either cast iron, or un-hardened steel. This is the type of engine we'll be looking at to repair, although I can see no reason why the materials we'll be using shouldn't work on the soft cylinder-hardened piston American glow types, as expansion rates are similar.

The engine I'll be making a piston for is a 1940s American Deezil. I have heard myths

.....
Photo 1. The repaired Deezil running sweetly on a 10x5 propeller. The basic design is good, but was let down by poor workmanship and materials.

1



Making a Piston and Contra-Piston

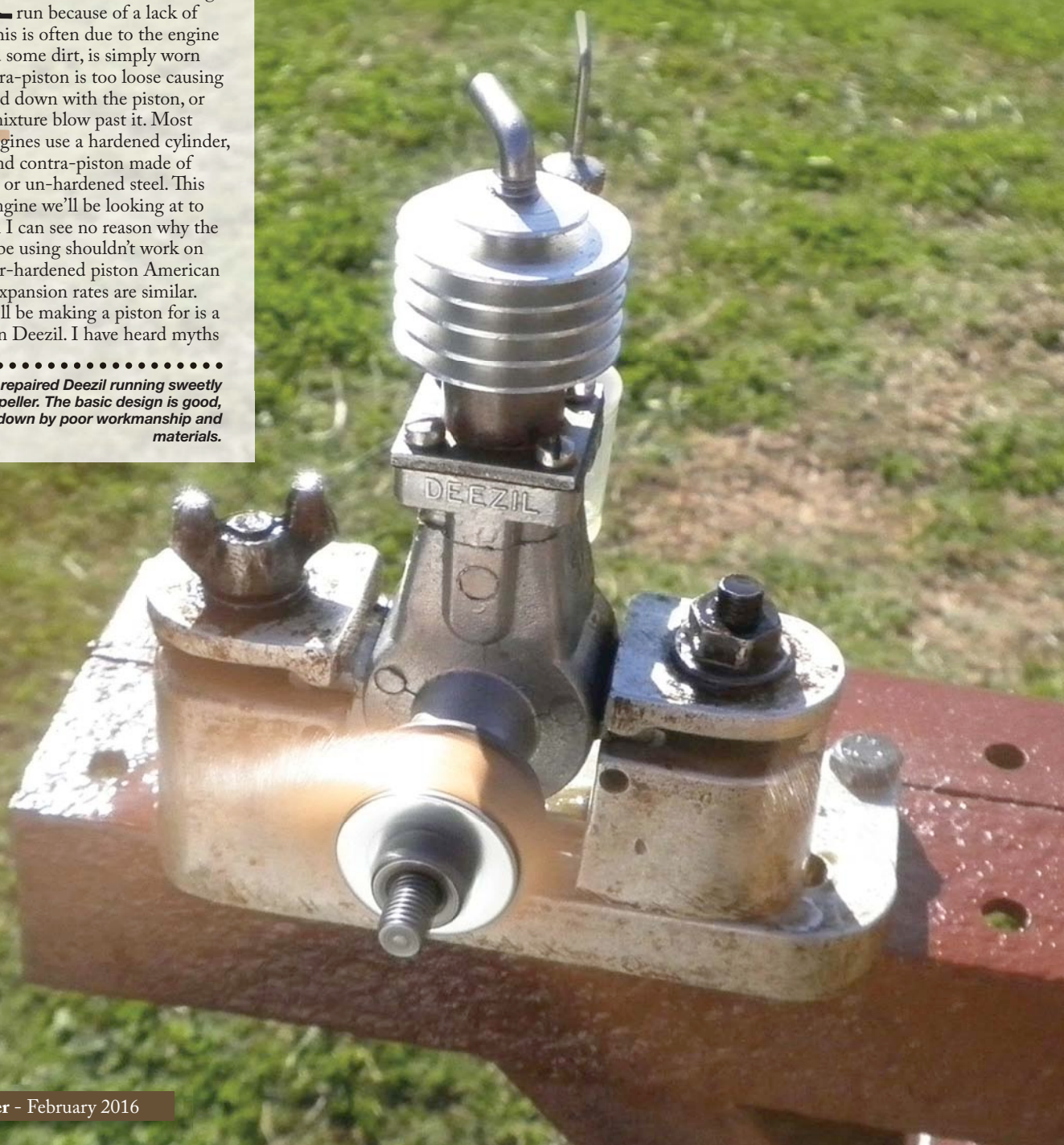
Allan Joyce gives step by step instructions for the lathe work required to make replacement simple piston assemblies.

Most modellers will have at least one engine sitting in a drawer or on a shelf in the shed that will no longer run because of a lack of compression. This is often due to the engine having ingested some dirt, is simply worn out, or the contra-piston is too loose causing it to float up and down with the piston, or lets the firing mixture blow past it. Most model diesel engines use a hardened cylinder, with a piston and contra-piston made of either cast iron, or un-hardened steel. This is the type of engine we'll be looking at to repair, although I can see no reason why the materials we'll be using shouldn't work on the soft cylinder-hardened piston American glow types, as expansion rates are similar.

The engine I'll be making a piston for is a 1940s American Deezil. I have heard myths

.....
Photo 1. The repaired Deezil running sweetly on a 10x5 propeller. The basic design is good, but was let down by poor workmanship and materials.

1



2



4



that some of these engines did actually run from new, but have never actually witnessed it. None of my examples had enough compression to even fire consistently while trying to start them. **Photo 1** shows my Deezil with the new piston happily purring away on a 10x5" propeller. The internals of this engine were made of materials of dubious quality, the con-rod and gudgeon pin are bronze, and the crankshaft is made in 3 pieces of soft steel which are brazed together (**Photo 2**). If I was going to use this engine in an aircraft, I would also make a one-piece crank, a steel gudgeon pin, and an aluminium alloy con-rod. This would improve the balancing of the moving parts, and remove the risk of failure of the crankshaft.

Selecting an Engine to Repair

The easiest pistons and contra-pistons to make are ones with a flat crown (top), and this is the type we'll be looking at making in this article. Don't be put off if your first attempt isn't a great success. The first engine I made 25 years ago is an 8cc version of the Mills 1.3 (**Photo 3**). I had 4 goes before I got a good piston fit, and the aluminium con-rod wasn't strong enough causing it to bend on the second start. It now has a steel rod made from an 8.8 bolt.

Examining the Engine

Squirt a little fuel into the exhaust port of the engine and turn it over slowly. (SLOWLY, NOT FAST ENOUGH TO FIRE!!) If the engine has radial ports, bubbles can often be seen coming from one spot only. Once the cylinder has been loosened, rotate it to a different position & re-do the fuel test. If the bubbles are still in the same place, it's a piston

3

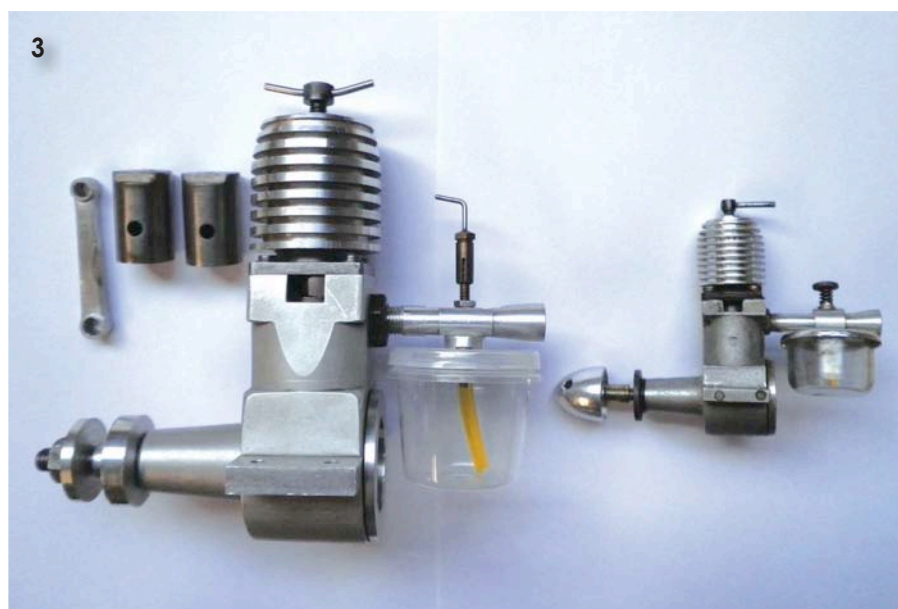


Photo 2. The original internal parts of the Deezil. The piston, contra-piston and gudgeon pin are replaced in this article.

Photo 3. The first engine I made, an 8cc Mills. The Indian Mills 1.3cc gives scale to it.

Photo 4. Drills, lathe tools and measuring equipment you will need

problem. If the position of the bubbles has moved relative to the turning of the cylinder, it's a cylinder problem.

I normally warm an engine up in the oven at 100°C for 10 minutes, then strip it using leather gloves and the relative tools. Warming the engine up softens the gummy castor oil, and expands the aluminium slightly, and hopefully makes the removal of screwed in cylinder liners and back plates easier. No pliers on cylinders please! Use a strap wrench on aluminium screwed on cylinder heads. The Silver Swallow 1.5 and 2.5cc engines come with a wrench to tighten and loosen the cylinder, and these will fit most engines in these sizes. I've made wrenches to fit the smaller engines too, which is not a difficult task.

Examine the cylinder first, as these are normally hardened, they tend to survive small particles of dirt that have entered from a crash followed by the engine being turned over before it's cleaned out. If vertical scratches are present, don't discard the engine, as you will probably gain the expertise to carry out a cylinder repair in time to come. If the cylinder looks to be in good condition, it should be a good candidate for fitting a new piston. Examine the piston & con-rod for odd wear patterns, and excessive small-end wear in the conrod from the gudgeon pin movement. A new larger gudgeon pin is easily made, and is covered in this article.

I always mark the piston (on top) and con-rod on the rear side, to remember orientation. I do this as the rod sometimes has an offset towards the front or rear for alignment purposes, and gudgeon pins are sometimes offset towards the left side when viewed from the rear to present a better angle of the rod to

the crankshaft to provide a slight increase in power, and reduce stresses.

Machinery and Tools

You will need a lathe, turning and parting off tools, pillar drill, micrometer, Imperial and/or metric drills, a centre drill, flat files, sandpaper, and a vernier (**Photo 4**). The digital micrometer shown reads down to one thousandth of a millimetre, or one ten thousandth of an inch, so is more accurate than a normal micrometer, enabling you to get closer to the finished size with less error.

My lathe in **photo 5** is fitted with a quick change tool post and keyless drill chuck, well worth the money for speed and ease of operation. Note the newspaper under the lathe bed to catch the swarf for easy disposal. The wooden blocks it's mounted on are simply to raise it up for more comfortable operation.

Material Selection

I have been using High Tensile steel bolts for piston and contra-piston material for some time now, even if the original piston was made of cast iron. **Photo 6** shows the markings on the heads of 2 bolts. The one on the left is marked 8.8, and is metric, the one on the right has 3 lines and is an imperial bolt. They both have the same tensile strength, and are readily available from industrial fastener suppliers, motor vehicle spares shops and hardware suppliers. Ask your supplier for a well-known brand name, as some of the cheaper bolts have hard spots in them that will take the sharp edge off your drills and lathe tools. Avoid bolts with a silver or yellow coloured plating, as I have found some of

2



4



that some of these engines did actually run from new, but have never actually witnessed it. None of my examples had enough compression to even fire consistently while trying to start them. **Photo 1** shows my Deezil with the new piston happily purring away on a 10x5" propeller. The internals of this engine were made of materials of dubious quality, the con-rod and gudgeon pin are bronze, and the crankshaft is made in 3 pieces of soft steel which are brazed together (**Photo 2**). If I was going to use this engine in an aircraft, I would also make a one-piece crank, a steel gudgeon pin, and an aluminium alloy con-rod. This would improve the balancing of the moving parts, and remove the risk of failure of the crankshaft.

Selecting an Engine to Repair

The easiest pistons and contra-pistons to make are ones with a flat crown (top), and this is the type we'll be looking at making in this article. Don't be put off if your first attempt isn't a great success. The first engine I made 25 years ago is an 8cc version of the Mills 1.3 (**Photo 3**). I had 4 goes before I got a good piston fit, and the aluminium con-rod wasn't strong enough causing it to bend on the second start. It now has a steel rod made from an 8.8 bolt.

Examining the Engine

Squirt a little fuel into the exhaust port of the engine and turn it over slowly. (SLOWLY, NOT FAST ENOUGH TO FIRE!!) If the engine has radial ports, bubbles can often be seen coming from one spot only. Once the cylinder has been loosened, rotate it to a different position & re-do the fuel test. If the bubbles are still in the same place, it's a piston

3

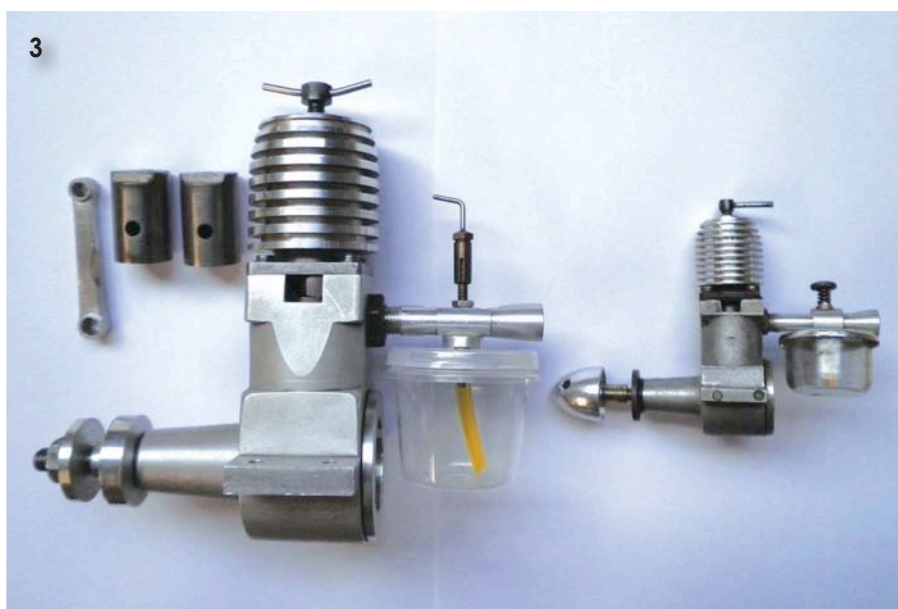


Photo 2. The original internal parts of the Deezil. The piston, contra-piston and gudgeon pin are replaced in this article.

Photo 3. The first engine I made, an 8cc Mills. The Indian Mills 1.3cc gives scale to it.

Photo 4. Drills, lathe tools and measuring equipment you will need

problem. If the position of the bubbles has moved relative to the turning of the cylinder, it's a cylinder problem.

I normally warm an engine up in the oven at 100°C for 10 minutes, then strip it using leather gloves and the relative tools. Warming the engine up softens the gummy castor oil, and expands the aluminium slightly, and hopefully makes the removal of screwed in cylinder liners and back plates easier. No pliers on cylinders please! Use a strap wrench on aluminium screwed on cylinder heads. The Silver Swallow 1.5 and 2.5cc engines come with a wrench to tighten and loosen the cylinder, and these will fit most engines in these sizes. I've made wrenches to fit the smaller engines too, which is not a difficult task.

Examine the cylinder first, as these are normally hardened, they tend to survive small particles of dirt that have entered from a crash followed by the engine being turned over before it's cleaned out. If vertical scratches are present, don't discard the engine, as you will probably gain the expertise to carry out a cylinder repair in time to come. If the cylinder looks to be in good condition, it should be a good candidate for fitting a new piston. Examine the piston & con-rod for odd wear patterns, and excessive small-end wear in the conrod from the gudgeon pin movement. A new larger gudgeon pin is easily made, and is covered in this article.

I always mark the piston (on top) and con-rod on the rear side, to remember orientation. I do this as the rod sometimes has an offset towards the front or rear for alignment purposes, and gudgeon pins are sometimes offset towards the left side when viewed from the rear to present a better angle of the rod to

the crankshaft to provide a slight increase in power, and reduce stresses.

Machinery and Tools

You will need a lathe, turning and parting off tools, pillar drill, micrometer, Imperial and/or metric drills, a centre drill, flat files, sandpaper, and a vernier (**Photo 4**). The digital micrometer shown reads down to one thousandth of a millimetre, or one ten thousandth of an inch, so is more accurate than a normal micrometer, enabling you to get closer to the finished size with less error.

My lathe in **photo 5** is fitted with a quick change tool post and keyless drill chuck, well worth the money for speed and ease of operation. Note the newspaper under the lathe bed to catch the swarf for easy disposal. The wooden blocks it's mounted on are simply to raise it up for more comfortable operation.

Material Selection

I have been using High Tensile steel bolts for piston and contra-piston material for some time now, even if the original piston was made of cast iron. **Photo 6** shows the markings on the heads of 2 bolts. The one on the left is marked 8.8, and is metric, the one on the right has 3 lines and is an imperial bolt. They both have the same tensile strength, and are readily available from industrial fastener suppliers, motor vehicle spares shops and hardware suppliers. Ask your supplier for a well-known brand name, as some of the cheaper bolts have hard spots in them that will take the sharp edge off your drills and lathe tools. Avoid bolts with a silver or yellow coloured plating, as I have found some of

5



6



7



these are not actually as hard as they should be, and expand more than the black ones. The bolt you select should be at least 1.5mm larger in diameter than the piston you are going to make. The reason for this is because during the hardening process there is often a very hard outer skin on the bolt that needs to be machined off.

If you choose to use cast iron, a close-grain type with high impact strength is preferable. Meehanite is the trade name that is normally associated with close-grain cast iron.

one larger drill will be needed.

Cut the head off the chosen bolt, and place it in the 3 jaw lathe chuck leaving enough protruding to machine a length approximately 8 mm longer than the piston, plus some clearance to the chuck as you will be working close to it with a file. Do not be tempted to have too much material protruding from the chuck, as this will cause chattering while you are machining. The correct way to tighten the chuck is to tighten at all 3 points, then re-check them before starting the machine.

8



9



Let's Get Started

I always wear a short sleeved shirt or jacket when I'm operating any moving machinery to lessen the risk of serious injury by being dragged into a machine. Remember, the machine is not going to stop and ask if you are OK! Follow all the safety recommendations that come with the machinery you use.

Select the drills you will need to drill the inside of the piston to size, including a smaller 'pilot' drill. Place each drill into the piston and mark the depth with a fine point felt tip pen (Photo 7). When drilling a large hole, drilling a smaller hole prior to the larger size makes the job easier and the larger hole will remain concentric and on size. Not all pistons have a larger recess below the gudgeon pin, so only

The Machining Operations

Face the end of the material, note the angle of the lathe tool (Photo 8), then use the centre drill to start the hole (Photo 9). Drill the pilot hole (smallest drill) then the second largest drill, then the largest drill. Photo 10 shows the second drill on the mark at its full depth. I set the lathe speed at 350 rpm for drilling harder materials.

Measure the diameter of the original piston (Photo 11), and add on 0.01 to 0.02mm to this figure, which should give us enough material to polish off to fit a normal worn engine if we machine the outside diameter of the material to this size. As the piston of the Deezil engine is obviously way too small, I've used a telescopic gauge to measure the

Photo 5. My lathe, very accurate once all adjustments had been set correctly.

Photo 6. Metric and Imperial bolts showing the head markings.

Photo 7. Drills marked for depth.

Photo 8. Facing the end of the material.

Photo 9. A centre drill is used to start the hole.

5



6



7



these are not actually as hard as they should be, and expand more than the black ones. The bolt you select should be at least 1.5mm larger in diameter than the piston you are going to make. The reason for this is because during the hardening process there is often a very hard outer skin on the bolt that needs to be machined off.

If you choose to use cast iron, a close-grain type with high impact strength is preferable. Meehanite is the trade name that is normally associated with close-grain cast iron.

one larger drill will be needed.

Cut the head off the chosen bolt, and place it in the 3 jaw lathe chuck leaving enough protruding to machine a length approximately 8 mm longer than the piston, plus some clearance to the chuck as you will be working close to it with a file. Do not be tempted to have too much material protruding from the chuck, as this will cause chattering while you are machining. The correct way to tighten the chuck is to tighten at all 3 points, then re-check them before starting the machine.

8



9



Let's Get Started

I always wear a short sleeved shirt or jacket when I'm operating any moving machinery to lessen the risk of serious injury by being dragged into a machine. Remember, the machine is not going to stop and ask if you are OK! Follow all the safety recommendations that come with the machinery you use.

Select the drills you will need to drill the inside of the piston to size, including a smaller 'pilot' drill. Place each drill into the piston and mark the depth with a fine point felt tip pen (Photo 7). When drilling a large hole, drilling a smaller hole prior to the larger size makes the job easier and the larger hole will remain concentric and on size. Not all pistons have a larger recess below the gudgeon pin, so only

The Machining Operations

Face the end of the material, note the angle of the lathe tool (Photo 8), then use the centre drill to start the hole (Photo 9). Drill the pilot hole (smallest drill) then the second largest drill, then the largest drill. Photo 10 shows the second drill on the mark at its full depth. I set the lathe speed at 350 rpm for drilling harder materials.

Measure the diameter of the original piston (Photo 11), and add on 0.01 to 0.02mm to this figure, which should give us enough material to polish off to fit a normal worn engine if we machine the outside diameter of the material to this size. As the piston of the Deezil engine is obviously way too small, I've used a telescopic gauge to measure the

Photo 5. My lathe, very accurate once all adjustments had been set correctly.

Photo 6. Metric and Imperial bolts showing the head markings.

Photo 7. Drills marked for depth.

Photo 8. Facing the end of the material.

Photo 9. A centre drill is used to start the hole.



cylinder (Photo 12 and 13), added 0.01mm and machined the material to this size (Photo 14). I have the lathe set at 900 rpm, and the feed speed at 0.005" per rpm for this operation. This is a guide only, and gives a good finish with the lathe tool I'm using.

Final Polishing

USE EXTREME CAUTION WITH THIS NEXT OPERATION AS YOU WILL BE WORKING VERY CLOSE TO THE LATHE CHUCK! If your lathe has a chuck guard, use it - it's there to prevent body parts coming into contact with the chuck!

The file you will need should be a little wider than the length of the piston, so its whole length is polished evenly. Always use a handle on your files, the tang can cause serious injury! The sandpaper I use to polish the piston blank is Non-clog aluminium oxide 240 grit, available from hardware shops. Cut a couple of strips a little wider than the file, and hold it on the file as shown in photo 15. With the lathe still turning at 900 RPM,



push the file across the piston blank 3 or 4 times using a gentle downward pressure, then check the piston blank size in 3 places with your micrometer to make sure it is parallel. Wipe the blank clean with a cloth, and see if the cylinder will fit over it. If not, repeat the process until the cylinder will only just slide onto the blank for the length of the finished piston (Photo 16).

The sandpaper wears very quickly, which is why you may need more than one piece. It also gives a very good finish once it has worn, so you don't need to do a final polish with finer grit paper. I've also found that it doesn't embed its grit in the workpiece, unlike some types of emery paper.

Parting Off the Piston

I use a vernier set to the old piston length to set the parting tool position (Photo 17). You could also just use the old piston held next to the new one to do this. Lock the lathe saddle before starting the parting off operation. I set my lathe speed at 350rpm for this operation.



Once you have machined approximately half way into the material, retract the parting tool, and using a fine file held at 45°, gently touch the sharp edge on the top of the piston and push the file forward once to remove it (Photo 18). Once the piston has been parted off, the little 'pip' on the crown can be filed off. Photo 19 shows the size of the new piston for

Photo 10. The second drill at full depth. The mark can just be seen against the face of the material. **Photo 11.** Measuring the old piston. Note no wear marks or discolouring, as this engine didn't have enough compression to even start! **Photo 12.** Measuring the bore using a telescopic gauge. **Photo 13.** The bore size of the Deezil is somewhat larger than the piston size! **Photo 14.** The material is machined 0.01mm larger than the required piston size. **Photo 15.** Polishing to size is done using a file and non-clog sandpaper. **Photo 16.** Test fitting the cylinder on the new piston blank. **Photo 17.** Setting the parting tool to get the same piston length as the original. I have left the old piston in the jaws of the vernier for clarity. **Photo 18.** Removing the sharp edge on the top of the piston with a file, before parting it off completely. **Photo 19.** The new piston, somewhat larger than the old one!





cylinder (Photo 12 and 13), added 0.01mm and machined the material to this size (Photo 14). I have the lathe set at 900 rpm, and the feed speed at 0.005" per rpm for this operation. This is a guide only, and gives a good finish with the lathe tool I'm using.

Final Polishing

USE EXTREME CAUTION WITH THIS NEXT OPERATION AS YOU WILL BE WORKING VERY CLOSE TO THE LATHE CHUCK! If your lathe has a chuck guard, use it - it's there to prevent body parts coming into contact with the chuck!

The file you will need should be a little wider than the length of the piston, so its whole length is polished evenly. Always use a handle on your files, the tang can cause serious injury! The sandpaper I use to polish the piston blank is Non-clog aluminium oxide 240 grit, available from hardware shops. Cut a couple of strips a little wider than the file, and hold it on the file as shown in photo 15. With the lathe still turning at 900 RPM,



push the file across the piston blank 3 or 4 times using a gentle downward pressure, then check the piston blank size in 3 places with your micrometer to make sure it is parallel. Wipe the blank clean with a cloth, and see if the cylinder will fit over it. If not, repeat the process until the cylinder will only just slide onto the blank for the length of the finished piston (Photo 16).

The sandpaper wears very quickly, which is why you may need more than one piece. It also gives a very good finish once it has worn, so you don't need to do a final polish with finer grit paper. I've also found that it doesn't embed its grit in the workpiece, unlike some types of emery paper.

Parting Off the Piston

I use a vernier set to the old piston length to set the parting tool position (Photo 17). You could also just use the old piston held next to the new one to do this. Lock the lathe saddle before starting the parting off operation. I set my lathe speed at 350rpm for this operation.

12



13



Once you have machined approximately half way into the material, retract the parting tool, and using a fine file held at 45°, gently touch the sharp edge on the top of the piston and push the file forward once to remove it (Photo 18). Once the piston has been parted off, the little 'pip' on the crown can be filed off. Photo 19 shows the size of the new piston for

Photo 10. The second drill at full depth. The mark can just be seen against the face of the material. Photo 11. Measuring the old piston. Note no wear marks or discolouring, as this engine didn't have enough compression to even start! Photo 12. Measuring the bore using a telescopic gauge. Photo 13. The bore size of the Deezil is somewhat larger than the piston size! Photo 14. The material is machined 0.01mm larger than the required piston size. Photo 15. Polishing to size is done using a file and non-clog sandpaper. Photo 16. Test fitting the cylinder on the new piston blank. Photo 17. Setting the parting tool to get the same piston length as the original. I have left the old piston in the jaws of the vernier for clarity. Photo 18. Removing the sharp edge on the top of the piston with a file, before parting it off completely. Photo 19. The new piston, somewhat larger than the old one!





Photo 20. Make sure the drill table is at right angles to the quill. **Photo 21.** Setting up the jig using the old piston as a guide. **Photo 22.** Using the old piston and a piece of dowel to clamp the new piston in position, a centre drill is used to mark the position of the gudgeon pin hole. **Photo 23.** The completed gudgeon pin hole. Note the wood shavings as the dowel has also been drilled through. **Photo 24.** Piston set up with the mark for the cutout aligned with a lathe chuck jaw. **Photo 25.** Use the old piston to set the depth of the cutout. **Photo 26.** The completed cutout after filing. **Photo 27.** I use a drill chuck held in the lathe chuck to round off and polish gudgeon pin ends.

the Deeziel. Compare this reading to the size of the old piston and the cylinder bore size. The new piston has a clearance of 0.008mm, the old one had a clearance of 0.027mm. No wonder the engine wouldn't run!

Drilling the Gudgeon Pin Hole

Check that the table on your pillar drill is at 90° to the chuck, using a piece of metal rod or dowel fastened in the chuck and a square (**Photo 20**). Select a drill the same size as the gudgeon pin by trying it in the old piston, plus a drill one size smaller for the pilot hole.

The jig I use for drilling the gudgeon pin hole is nothing more than a piece of wooden skirting board that has grooves machined in the back of it. Offcuts of grooved wood can often be scrounged from carpenters, builders, furniture makers etc. Make sure the piston doesn't touch the bottom of the groove when placed in it, otherwise it will be able to twist from side to side, and the hole won't be drilled accurately. Screw a self-tapping screw into the centre of the groove to act as a stop. Using the gudgeon pin size drill fitted in the pillar drill (turned off), and the old piston placed in the jig, bring the drill down so it goes right

through the piston. Position the jig so that the self-tapping screw is against the top of the piston, and the piston is sitting snugly in the groove. Clamp the jig to the table as shown in **photo 21**.

Select a piece of dowel as close to the inside piston diameter as possible. Cut a suitable length of dowel so that when the new and old pistons are placed on each end, it can be clamped in the jig as shown in **photo 22**. This will hold the piston level, and prevent it moving while drilling. Make sure the new piston is against the self-tapping screw, and seated in the groove. Using a centre drill, drill a short way into the piston (also shown in **photo 22**). This is to act as a centre punch mark, because if you try to drill the round piston with an ordinary drill, it will run off line and drill in the wrong position.

Carefully drill the piston right through using the pilot drill, followed by the gudgeon pin size drill. You will also have drilled through the hold-down dowel (**Photo 23**). Remove the piston from the jig, and carefully file any ragged edges from the inside and outside of the hole using a needle file, then check the gudgeon pin fit. If the pin is a little

tight, some careful work with a needle file may be needed. I know the gudgeon pin hole is normally reamed to the exact size, but I have never had a problem using the above method, and some of the engines I've repaired have had many, many flights, and are still in good order after stripping for inspection.

Testing the Piston Fit

If the piston has a cut out on the crown, it must only be done after this initial trial fitting. Wash all parts of the engine using paraffin (kerosene) or similar and a toothbrush. Use neoprene gloves and safety glasses, and make sure there are no naked flames or sparks that could cause a fire. Oil all moving parts and assemble the engine without the contra-piston. I use automotive engine oil, as it is not 'gooey' like castor oil.

Fit a propeller, and gently turn the engine over, it should turn over easily, although some engines have a very slight taper in the cylinder to improve compression, and may feel slightly tight as the piston comes to the top of the stroke. If it feels very tight, remove the piston and wash all the oil off it. Holding the piston skirt (bottom of the piston), and



Photo 20. Make sure the drill table is at right angles to the quill. **Photo 21.** Setting up the jig using the old piston as a guide. **Photo 22.** Using the old piston and a piece of dowel to clamp the new piston in position, a centre drill is used to mark the position of the gudgeon pin hole. **Photo 23.** The completed gudgeon pin hole. Note the wood shavings as the dowel has also been drilled through. **Photo 24.** Piston set up with the mark for the cutout aligned with a lathe chuck jaw. **Photo 25.** Use the old piston to set the depth of the cutout. **Photo 26.** The completed cutout after filing. **Photo 27.** I use a drill chuck held in the lathe chuck to round off and polish gudgeon pin ends.

the Deeziel. Compare this reading to the size of the old piston and the cylinder bore size. The new piston has a clearance of 0.008mm, the old one had a clearance of 0.027mm. No wonder the engine wouldn't run!

Drilling the Gudgeon Pin Hole

Check that the table on your pillar drill is at 90° to the chuck, using a piece of metal rod or dowel fastened in the chuck and a square (**Photo 20**). Select a drill the same size as the gudgeon pin by trying it in the old piston, plus a drill one size smaller for the pilot hole.

The jig I use for drilling the gudgeon pin hole is nothing more than a piece of wooden skirting board that has grooves machined in the back of it. Offcuts of grooved wood can often be scrounged from carpenters, builders, furniture makers etc. Make sure the piston doesn't touch the bottom of the groove when placed in it, otherwise it will be able to twist from side to side, and the hole won't be drilled accurately. Screw a self-tapping screw into the centre of the groove to act as a stop. Using the gudgeon pin size drill fitted in the pillar drill (turned off), and the old piston placed in the jig, bring the drill down so it goes right

through the piston. Position the jig so that the self-tapping screw is against the top of the piston, and the piston is sitting snugly in the groove. Clamp the jig to the table as shown in **photo 21**.

Select a piece of dowel as close to the inside piston diameter as possible. Cut a suitable length of dowel so that when the new and old pistons are placed on each end, it can be clamped in the jig as shown in **photo 22**. This will hold the piston level, and prevent it moving while drilling. Make sure the new piston is against the self-tapping screw, and seated in the groove. Using a centre drill, drill a short way into the piston (also shown in **photo 22**). This is to act as a centre punch mark, because if you try to drill the round piston with an ordinary drill, it will run off line and drill in the wrong position.

Carefully drill the piston right through using the pilot drill, followed by the gudgeon pin size drill. You will also have drilled through the hold-down dowel (**Photo 23**). Remove the piston from the jig, and carefully file any ragged edges from the inside and outside of the hole using a needle file, then check the gudgeon pin fit. If the pin is a little

tight, some careful work with a needle file may be needed. I know the gudgeon pin hole is normally reamed to the exact size, but I have never had a problem using the above method, and some of the engines I've repaired have had many, many flights, and are still in good order after stripping for inspection.

Testing the Piston Fit

If the piston has a cut out on the crown, it must only be done after this initial trial fitting. Wash all parts of the engine using paraffin (kerosene) or similar and a toothbrush. Use neoprene gloves and safety glasses, and make sure there are no naked flames or sparks that could cause a fire. Oil all moving parts and assemble the engine without the contra-piston. I use automotive engine oil, as it is not 'gooey' like castor oil.

Fit a propeller, and gently turn the engine over, it should turn over easily, although some engines have a very slight taper in the cylinder to improve compression, and may feel slightly tight as the piston comes to the top of the stroke. If it feels very tight, remove the piston and wash all the oil off it. Holding the piston skirt (bottom of the piston), and

using some worn sandpaper wrapped around the top of the piston, gently turn it backwards and forwards 2 or 3 times. Wash the piston, re-assemble the engine and re-test. You may have to do this a few times to get it right. The Deeziel cylinder is tapered in this way - I'm not sure if this was by design or by error!

Piston Cut-outs

Some pistons have a cut-out to allow uncovering of the transfer port, as per the Mills engine I made. I've used this piston in the photos as it is large enough to see more clearly. Mark the centre point of where the cut-out must be on the top of the new piston, wrap a piece of cardboard from a cereal box around it for protection, and place it in the lathe chuck with the line in the centre of a jaw as shown in **photo 24**, but don't fully tighten the chuck yet. Using the original piston, place it with the cut-out as shown in **photo 25**, and push it up to the chuck jaw. This will allow an amount of the new piston to protrude past the jaw equal to the depth of the cut-out. Tighten the chuck just enough to hold the piston. If it is over-tightened, you will damage your new piston.

Grind the cutting teeth off one edge (the thin side) of a second cut file to act as a "safe" or non-cutting edge. By placing this

edge against the lathe jaw with the mark on the piston, you can now accurately file the cut-out while holding the chuck with your other hand. Un-plug your lathe for this operation to avoid an accidental start-up of the machine! Check regularly against the old piston to make sure you get the same depth, and the cut-out is square with the chuck jaw. Clean any rough edges with a needle file. The finished cut-out is shown in **photo 26**.

Making a Gudgeon Pin

I use the shank (non-twisted part) of a drill to make gudgeon pins. The shank is normally not hardened, and can be easily machined and polished to size as per the piston. I then cut it to length using a hacksaw, and round off and polish the ends using a file and sandpaper. I hold the pin in a drill chuck, which is in turn held in the lathe chuck (**Photo 27**). Alternatively, this process could be carried out in a pillar drill.

Drill bits are made from steel containing a high carbon content, and can be heat treated to harden and temper them to suit various applications. Some original model engine gudgeon pins are hardened, but I normally don't bother, as other engines I've repaired have used softer material than a drill bit shank, and have shown little wear.

I have also used spring wire for gudgeon pins. Spring wire cannot be machined, so the diameter closest to the pin must be selected, and polished down to size.

Making a Contra-Piston

The contra-piston is made in exactly the same way as the piston. If the original was a loose fit in the cylinder, leave it approximately 0.005mm larger than the original after polishing. Test the fit in the top of the bore, it may go in a little way, then tighten up. Do not push the liner hard onto the new contra-piston, as you may not be able to get it off again without removing the job from the lathe. Part it off as per the piston.

Footnote

I realise that some of the processes I've used here may not be 'accepted practice' in engineering circles, as my intention has been to enable modellers to make something using limited resources and without having to make time-consuming jigs or buying tooling that may only be used once. It is also for this reason that I haven't covered domed or conical pistons and contra-pistons, as once the modeller has a little experience and success, these projects can be tackled with more confidence. ●



using some worn sandpaper wrapped around the top of the piston, gently turn it backwards and forwards 2 or 3 times. Wash the piston, re-assemble the engine and re-test. You may have to do this a few times to get it right. The Deezil cylinder is tapered in this way - I'm not sure if this was by design or by error!

Piston Cut-outs

Some pistons have a cut-out to allow uncovering of the transfer port, as per the Mills engine I made. I've used this piston in the photos as it is large enough to see more clearly. Mark the centre point of where the cut-out must be on the top of the new piston, wrap a piece of cardboard from a cereal box around it for protection, and place it in the lathe chuck with the line in the centre of a jaw as shown in **photo 24**, but don't fully tighten the chuck yet. Using the original piston, place it with the cut-out as shown in **photo 25**, and push it up to the chuck jaw. This will allow an amount of the new piston to protrude past the jaw equal to the depth of the cut-out. Tighten the chuck just enough to hold the piston. If it is over-tightened, you will damage your new piston.

Grind the cutting teeth off one edge (the thin side) of a second cut file to act as a "safe" or non-cutting edge. By placing this

edge against the lathe jaw with the mark on the piston, you can now accurately file the cut-out while holding the chuck with your other hand. Un-plug your lathe for this operation to avoid an accidental start-up of the machine! Check regularly against the old piston to make sure you get the same depth, and the cut-out is square with the chuck jaw. Clean any rough edges with a needle file. The finished cut-out is shown in **photo 26**.

Making a Gudgeon Pin

I use the shank (non-twisted part) of a drill to make gudgeon pins. The shank is normally not hardened, and can be easily machined and polished to size as per the piston. I then cut it to length using a hacksaw, and round off and polish the ends using a file and sandpaper. I hold the pin in a drill chuck, which is in turn held in the lathe chuck (**Photo 27**). Alternatively, this process could be carried out in a pillar drill.

Drill bits are made from steel containing a high carbon content, and can be heat treated to harden and temper them to suit various applications. Some original model engine gudgeon pins are hardened, but I normally don't bother, as other engines I've repaired have used softer material than a drill bit shank, and have shown little wear.

I have also used spring wire for gudgeon pins. Spring wire cannot be machined, so the diameter closest to the pin must be selected, and polished down to size.

Making a Contra-Piston

The contra-piston is made in exactly the same way as the piston. If the original was a loose fit in the cylinder, leave it approximately 0.005mm larger than the original after polishing. Test the fit in the top of the bore, it may go in a little way, then tighten up. Do not push the liner hard onto the new contra-piston, as you may not be able to get it off again without removing the job from the lathe. Part it off as per the piston.

Footnote

I realise that some of the processes I've used here may not be 'accepted practice' in engineering circles, as my intention has been to enable modellers to make something using limited resources and without having to make time-consuming jigs or buying tooling that may only be used once. It is also for this reason that I haven't covered domed or conical pistons and contra-pistons, as once the modeller has a little experience and success, these projects can be tackled with more confidence. ●



EUROPE'S BEST SCALE SPACE MODELS...

Stuart Lodge was one of the judges and reports from the European Championship for Seniors & Juniors in August 2015.

Space Modelling takes you to interesting places. Ukraine has endured serious problems in recent times, with the European Championships originally awarded to Dnepropetrovsk in the east of the nation. The inevitable switch to Lviv in the southwest of the country was undertaken after the unrest started.

The Championships include many classes of scale and task rockets, but as I was there as one

of the scale judges, that is where I will focus.

Two Scale Classes

In the past, S7-Scale regularly featured too limited a variety of prototypes – typically, Saturn 1B, Arianes, and Soyuz – and thought was given to broadening the spectrum of competitive vehicles. A novel 'Originality' bonus was introduced, where a model earns 40 points if it is unique in the contest; 20 points if there are two and zero for three or more. There are

mixed opinions about this, but my experience in World Cup events since this 2014 rule was introduced has shown that entries are much more diverse and generally bigger. Novel rules also outlaw 'pencil' top stages, demanding the whole rocket be the same diameter; 25mm for Juniors, 30mm for Seniors.

S5-Scale Altitude is a performance class where the models are judged for rules/scale adherence, build/finish quality etc. (just like S7-Scale), then taken out and



MAIN IMAGE: Push the button and a perfect launch of the Zenit-3SL. First step of the way to the Gold....

FAR LEFT: ...staging! Mykola Puskar's rocket goes ever upward. Second step to the Gold...

LEFT: ... at far left Mykola hasn't realised it yet... European Champ in S7-Scale.





Looks good to me. Saturn 1B returned for checking post-flight...check out that first stage cluster.

flown under a defined motor impulse – 5 Newton second (Ns) 'B' motors for Juniors and 10Ns 'C' power for Seniors. The altitude achieved is measured by electronic altimeters (eAltimeters), with the final tally being the sum of the static scale points plus the eAltimeter score in metres. And yes, 'Originality' bonus also applies to S5 too.

S7 Scale

So did the 'Originality' bonus make a difference to the entries? First the first time in living memory there were no Soyuz models in S7, there were six Arianes across the range of marques and no less than eight Saturn 1Bs. Novel prototypes in the Juniors included, Matej Hagara's Lockheed Martin X17, Roman iznár with a super Athena 2, plus Dušan Udi with a Sonda S1 S2 – all received the 40 'Originality' points.

In the Seniors, Mykola Pushkar arguably had the most interesting rocket on show with a Zenit-3SL Sea Launch – a telecommunications satellite launcher. He scored 534 points in the Hall static judging, second only to Gregorz Goryczka's Saturn 1B, on 535. As ever for both Juniors and Seniors, it would all come down to the flying!

As judges for the flying, we have to mark for special effects (SFX), multi-staging and realism in the flight. The final flight of the whole contest was Mykola Pushkar's Zenit-3SL – a most impressive three stage boost with a full range of SFX was enough to win the Gold medal.

S5 Scale Altitude

The effect of the 'Originality' bonus was

Results

S7 Senior Scale

| | | | |
|---|-----|------------------|-----------------|
| 1 Mykola PUSHKAR | UKR | Zenit-3 SL | 534 + 232 = 766 |
| 2 Marek BUJAK | POL | Saturn 1B SA208 | 527 + 209 = 736 |
| 3 Gregorz GORYCZKA | POL | Saturn 1B SA 207 | 536 + 196 = 731 |
| Teams : 1st Ukraine, 2nd Slovakia, 3rd Poland | | | |

S7 Junior Scale

| | | | |
|--|-----|------------------|-----------------|
| 1 Andrzej RUSINOWSKI | POL | Saturn 1B SA 205 | 546 + 216 = 762 |
| 2 Wojciech KOSELSKI | POL | Saturn 1B SA 205 | 541 + 192 = 733 |
| 3 Oleg ZAYTSEV | UKR | Trailblazer IIF | 457 + 176 = 633 |
| Teams : 1st Poland, 2nd Romania, 3rd Ukraine | | | |

S5C Senior Scale Altitude

| | | | |
|---|-----|-------------|--------------------|
| 1 Michal ZITNAN | SVK | PBX 10/100t | 402pt + 442m = 844 |
| 2 Wojciech BOBROWSKI | POL | Arcas | 387pt + 340m = 727 |
| 3 Gregorz GORYCZKA | POL | Meteor 1 | 404pt + 316m = 720 |
| Teams : 1st Ukraine, 2nd Slovakia, 3rd Poland | | | |

S5B Junior Scale Altitude

| | | | |
|---|-----|------------------|--------------------|
| 1 Vladislav ZHURAVLYVOV | UKR | Nike Black Brant | 408pt + 233m = 641 |
| 2 Wojciech KOSZELSKI | POL | Meteor 1 | 409pt + 230m = 639 |
| 3 Andrzej RUSINOWSKI | POL | Meteor 1 | 403pt + 229m = 632 |
| Teams : 1st Ukraine, 2nd Poland, 3rd Slovakia | | | |

most pronounced in the S5 Senior and Junior classes – the judges had never even heard of, let alone seen, half the prototypes on the table! The awarding of the 'Originality' bonus marks was often down to being very specific about naming the version of the rocket being modelled – In the Seniors, Team USA (meaning that this was an Intercontinental championships) featured James Duffy, Matt & Kaitlyn Steele, with Black Brant IIIB, Black Brant VII & Black Brant IV respectively, all getting 40 points for 'Originality', while other Black Brant sounding prototypes did not; Ukrainians Sergii Shuliak, Valeriy Serdyuk & Serhii Trush all entered other Black Brants and gained no bonus points.

The S5 Juniors also featured plenty of diversity of model, with Slovakia once more innovative – Roman iznár & Dušan Udi with Isas/Jaxa prototype, Denis Galko with Citefa Ula 1. Poles Wojciech Koszelski and Andrzej Ruszymowski tabled Meteor 1 models and Michal Bobrowski an Arcas.

Before the event the Championships' Director, Mykhailo Riabokan, had expressed worries about how the entry would stand up. However, teams from Belarus, Bulgaria, Estonia, Italy, Latvia, Lithuania, Poland, Romania, Slovakia, Switzerland, Ukraine and USA, came out to 'do battle'. That the event was a spectacular success is due in no small part to brilliant publicity, courtesy of Marketing Director Olesya Garenko, and sponsorship from Noosphere Ventures and Ukraine International Airlines, plus Ukraine Spacemodelling Sport Federation and Aeroclub of Ukraine.

That Ukraine's European Champs' was wonderful because everybody wanted it to be. S5-Scale Altitude & S7-Scale, plus all the other classes, featured a level of models and flying that just gets better with each succeeding year. The new 'Originality' bonus in the scale rules may still need examining, but to my mind it has made the event more interesting with a wider spread of rockets modelled. ●



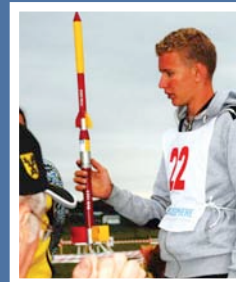
Chair of Judges Jan Kothua lays down the law regarding S5-Scale altitude. Good selection of new prototypes in the background.



James Duffy and Mike Nowak front up the Star Spangled banner for Team USA at the Opening Ceremony.



Mykola Pushkar (UKR) impressed the static judges with this super Zenit-3SL Sea Launch satellite launcher.



Dusan Udic (SVK) checks in his nice Sonda S1-S2 before his qualification flight in Junior S7-Scale.



REMEMBERING E. J. 'EDDIE' RIDING

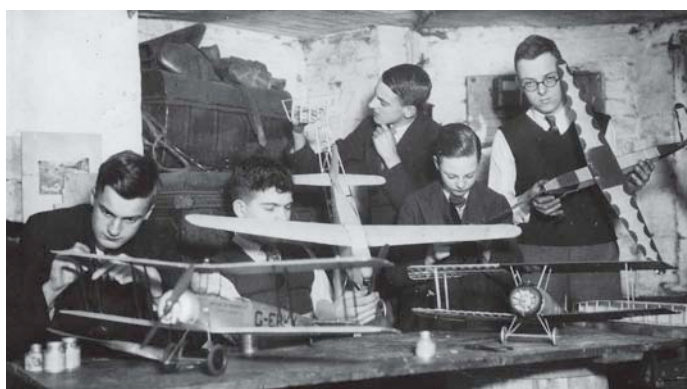
Although his contributions to AeroModeller spanned only nine years, the quality of Eddie Riding's output raised the bar in aeromodelling journalism. His scale model aircraft designs, draughtsmanship and photographic skills ushered in a new wave of professionalism that is still remembered 65 years after his untimely death in a flying accident.

.....

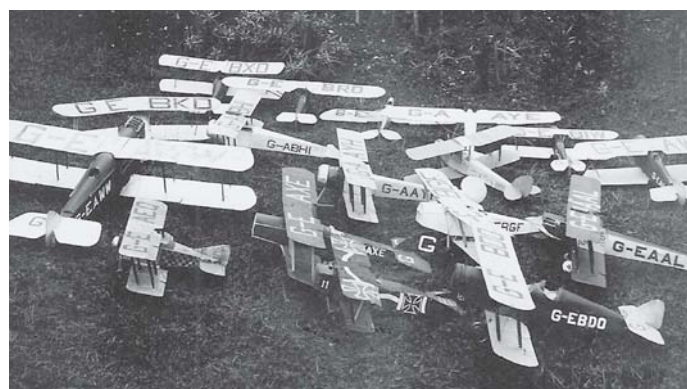
RICHARD RIDING looks back on his father's short life, with particular reference to his contribution to the world of scale aircraft modelling.



E.J. 'Eddie' Riding at his desk preparing an Aircraft Described for AeroModeller in the 1940s.



The Pre-WWII Chorlton-cum-Hardy Model Club where E.J.R. was a founding member.



Non-flying scale models were the order of the day at the Chorlton-cum-Hardy club.

E. J. 'Eddie' Riding (E.J.R.) was born at Little Heath, Charlton, south-east London 100 years ago in February 1916. In 1920 the family moved to Chorlton-cum-Hardy, a suburb of south-west Manchester. When Barton aerodrome opened in 1929

he began keeping a log of all aircraft that passed over his home. He was already making model aircraft and together with his pal, Jimmy Ellison (J.G.E.), was a founding member of the Chorlton-cum-Hardy Model Club. Meetings were held in a member's cellar, the club concentrating on non-flying

scale models. E.J.R.'s won several awards at competitions organised by the Manchester Evening Chronicle in the mid-1930s.

His introduction to flying proper came in September 1929 whilst on a family holiday in Yorkshire. The five bob (25p) flip in a Berkshire Aviation Tours' Avro 504K from



E.J.R. commissioned his friend Stanley Orton Bradshaw to paint this reminder of his first ever flight in 1929.



The RS-1 (Riding Sunter No.1.) monoplane got no further than this basic fuselage.



E.J.R.'s photo of his static Avro 504k caught the eye of the Aero Modeller editor.

March 1941 AeroModeller C.R.M. cover painting and photograph from which it was created features E.J.R. at home in Hayes, Middlesex at the beginning of the war, when he was an AID inspector at Fairey Aviation.

Whitby Moor so influenced the 13 year-old that he set his heart on a career in aviation. Years later he commissioned aeronautical artist and friend Stanley Orton Bradshaw to record that golden moment and the painting takes pride of place in my home.

E.J.R. began taking photographs of full-size aircraft from 1932, hanging around at local aerodromes - Wythenshawe,

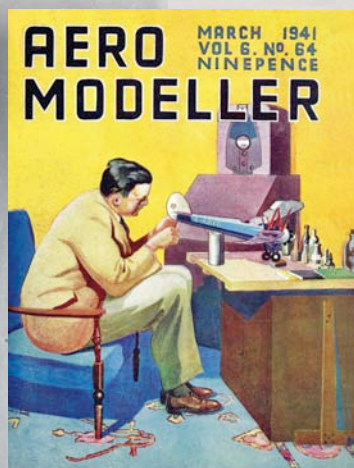
Ringway, Woodford and Barton - to do so. With the acquisition of a push bike he pedalled further afield to Hooton Park, Blackpool, and all points north, including a marathon return journey of 95 miles to photograph a Savage Skywriting S.E.5a. In 1934-5 he and school friend Fred Sunter embarked on building a full-size aircraft. The RS-1 (Riding Sunter No 1) was a single-seat, low-wing monoplane made mostly from

toured the length and breadth of the country photographing aircraft and cathedrals. By the outbreak of war both had accumulated a considerable collection of photographs, mostly of British civil-registered aircraft - and not many of cathedrals!

Full-Size Flying

E.J.R. was also accumulating flying hours. From his first flight in 1929 to the outbreak of war he managed 70 flights, amounting to 19 hours in a variety of types, including D.H.60 Moths, Avro 504Ks and Avro 640s. During 1937 both men started a flying course with the Northern Aviation School & Club at Barton, Manchester, and receiving instruction on the Czech-designed Hillson Praga, built locally under licence. After eight lessons E.J.R. ran out of cash and had to wait until 1945 to receive further instruction, albeit unofficially, on Mosquitoes! His most enjoyable pre-war period was spent with Martin Hearn Ltd at Hooton Park, Cheshire, in 1938. In addition to carrying out renewals of Certificates of Airworthiness he spent the autumn barnstorming with Hooton-based North-British Aviation's 'circus', living under canvas and keeping an Avro 504N and Fox Moth airworthy until the season ended in October.

The previous year there had been a parting of the ways when the Riding family moved to Wimborne, Dorset. Because he was then working at Blackburn Aircraft at Brough E.J.R. remained up north until the early part of 1939, when he began training for the Aeronautical Inspection Directorate (AID).



time the RS-1 remained a wingless promise of an unfulfilled dream. But the fuselage was more or less complete and was photographed on the forecourt of the Sunter garage at Timperley in 1936, just before the project was abandoned.

In August 1935 E.J.R. began a two-year apprenticeship with A.V. Roe at Newton Heath, Manchester. Aeromodelling took a back seat during the final years leading up to the war, but his interest in the real thing continued apace. On acquiring an Austin Seven he and J.G.E.



Later that year he married in secret, much to the chagrin of his parents. The newlyweds spent the early part of the war living in Hayes, Middlesex, close to Fairey Aviation's factory, where E.J.R. had his first AID posting. After inspecting the complexity that was the Fairey Albacore, he was transferred to London Aircraft Production (LAP) at Leavesden in 1942 where he signed-off Handley Page Halifaxes and had the opportunity for more flying. By the time he left LAP in 1944 he had amassed more than 80 flights in 70 different Halifaxes.

His next posting took him to the other side of Leavesden aerodrome, to de Havilland's Mosquito shadow factory, where he was responsible for signing-off Mosquito Mk III, 30, 33 and 36. On more than one occasion from late 1945 he and one production test pilot in particular carried out test flights over Bedfordshire and then treated the staff at Eaton Bray (see below) to an impromptu exhibition of low flying, several beat ups often being followed by a roll with one prop feathered. On one such flight the stopped engine would not restart and they had to make a single-engine landing back at Leavesden. This particular test pilot's speciality was rolling with both engines feathered! When E.J.R. left the AID in early 1946, amazingly in one piece, he had clocked up more than 90, mostly hairy, test flights in 70 different Mosquitoes.

Eaton Bray

Later that year E.J.R. began employment with Eaton Bray Model Sportsdrome Ltd,

formed in December 1944 by Douglas A. Russell. He had already become involved with associate company Harborough Publishing's Aircraft of the Fighting Powers series, producing all the drawings for the seventh and final volume. This volume was so popular that it was reprinted several times, but I was dismayed and angered to see that the final reprint omitted my father's name from the title page. He had also been co-author, with Owen Thetford, of Aircraft of the 1914-18 War, again producing all the 3-view drawings.

Up until 1940 E.J.R. had little time in which to indulge his hobby but, itching to get back to it, embarked upon a non-flying scale model of his favourite aeroplane, the Avro 504K. In a letter to J.G.E. in April that year he wrote: 'When I've finished my Avro I'm going to photograph it and send the result to Aero Modeller [two words in those days] to show them how to build scale models.' This first article was published in the December 1940 issue and included a full-page, 3-view of 504K G-EASF.

E.J.R.'s second article for AM, published in March 1941, featured a 24in-span non-flying scale model of the Avro Type 631 Cadet. Utilising his experience with full-size aircraft, models were built as far as possible using the same materials as the original: birch, 0.5mm ply and hard balsa. The models were covered with scale thickness fabric, doped in the correct red undercoating and finished in the usual manner. The D.H. 85 Leopard Moth followed in May 1941 (see the Bonus content at www.aeromodeller.com), then the Blackburn Dart seaplane in October and the

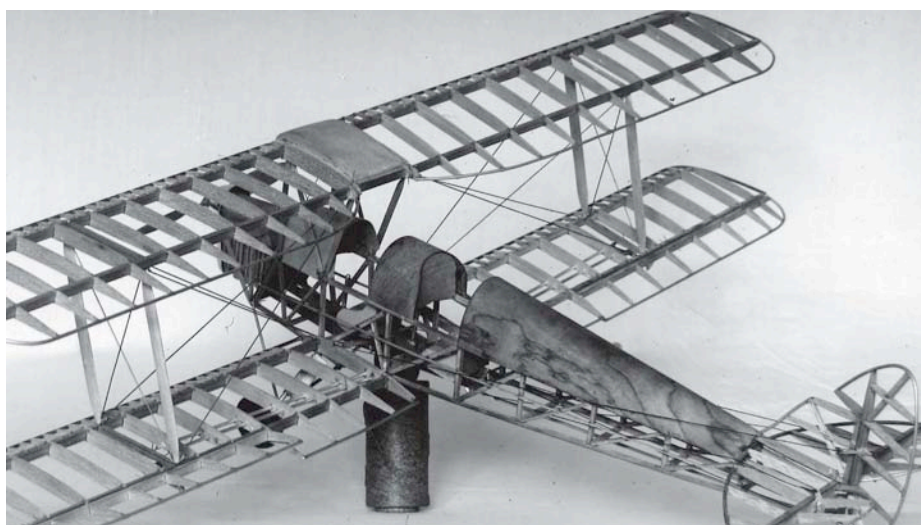
D.H. 82A Tiger Moth in February 1942. Such detailed work had rarely been seen or published up to this point. E.J.R.'s hands-on experience with the anatomies of full-size aircraft was very evident. His drawings and accompanying photographs of them raised the bar on draughtsmanship and the realistic depiction of model aircraft, heralding a sea change in the hobby. In addition to choosing convincing backgrounds (often at Leavesden), he photographed the models from a low angle and when on grass shears were used to trim it to scale.

Flying Scale Models

E.J.R.'s first flying scale model for AM appeared in the 1943 Christmas edition. Artist C. Rupert Moore (see the last issue of AM) had been hankering to produce a B.E.2c for some while, but because of pressure of other work he was happy to hand the job to E.J.R. Initially rubber-powered, like most of his flying models, the B.E. was later fitted with a diesel engine and remained airworthy into the early 1960s. Seven more scale flying models followed: Westland Widgeon (April 1943), Bristol Type 77 M1.C (October 1944), Bristol Type D Bullet (December 1945), A.B.C Robin (July 1946) and the Fairchild Argus (October 1947). Both the Chrislea Ace (August 1949) and the ANEC Missel Thrush (published posthumously December 1950) were built from the start to be diesel-powered. Except for the Bristol M1.C, these designs were good performers and popular with builders. The Missel Thrush was tested by AM staff after E.J.R.'s death



The skills of E.J.R. as a model maker and photographer are brought together in this cleverly staged shot of his Blackburn Dart seaplane.



Scale structure is revealed on this non-flying model of the DH Tiger Moth.

and when published had an appropriate cover by C. Rupert Moore. The plans for these designs should all still be available from www.myhobbystore.co.uk.

Although the conversion from rubber power to diesel was an improvement, one major drawback in those days was that there was no means by which to throttle back to tick-over speed. Another snag was that diesel engines spewed fuel oil into every crack and crevice of the airframe. To prevent this E.J.R. and others fitted oil-proof bulkheads, or arranged a system of collector plates and drains behind the cylinder head so that the residual oil could be conducted away beneath the model. All E.J.R.'s models were AM cover subjects for the artistic skills of C. Rupert Moore and I still possess the original artwork for the B.E.2c, Westland Widgeon, Bristol Bullet and the A.B.C. Robin.

In addition to designing models for the AeroModeller Plans Service, early articles by E.J.R. covered the history of civil aircraft markings, model aircraft photography, undercarriage design and skywriting, to name but a few. He is probably best remembered for two long running series - Civil Aircraft and Aircraft Described. The first of these began in December 1943 with the D.H. 83 Fox Moth. Each article was all his own work and each included a 1/72nd scale 3-view drawing and photographs from his extensive collection. This series ended in August 1947 with the

D.H. 89A Rapide, 42 types having been described in all. His Aircraft Described series began with the Percival Prentice in November 1947. At the time of his death in April 1950 he had chronicled and illustrated 32 types in the series, though the final two - the Aeronca 100 and Bristol Brabazon - were finished by George A. Cull and published posthumously. The 3-view of the Brabazon is wondrous to behold. I remember E.J.R. working on it and still have the drawing board on which he worked. Other AM features were his picture reports on the SBAC Radlett and Farnborough air shows. His action shots of other people's model aircraft are equally memorable, particularly those produced by master modellers John Greenland, Laurie Bagley and Bill Fisher. Incidentally, I was present when some of these aircraft were trimmed, tested and photographed at Leavesden aerodrome during the late 1940s. John Greenland's original model of the Chilton D.W.1 survives and was passed to a friend after John's death.

Air Displays

Whilst working for D. A. Russell's empire at Eaton Bray, E.J.R. had opportunities to turn the clock back to re-enact his barnstorming days by organising a couple of memorable flying displays, attracting some big names of the day in the process. There was always great excitement at Eaton Bray during the run up



E.J.R.'s first flying scale design for AeroModeller was the rubber powered Westland Widgeon in April 1943, complete with C. Rupert Moore cover painting.



to these displays. For example, on 5 June 1948 E.J.R. and Joan Nayler, later Mrs Douglas Russell, tested techniques for flour bombing, dropping toilet rolls from Joan's Fairchild Argus G-AKGW. Later that morning E.J.R. made a very low-level meander around the local area in a Miles Magister flown by C. Nepean Bishop to publicise the next day's display. This performance was repeated in 'Doc' Morrell's Tiger Moth G-AHRV. The

Later E.J.R. rubber powered designs were the A.B.C. Robin and Bristol Type 77 M1.C, photos taken low down to maximise the scale effect.





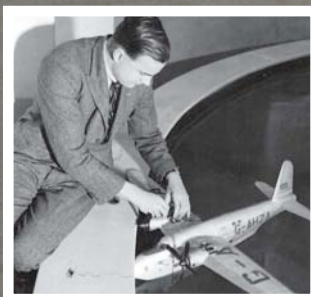
The Bristol Type D Bullet – a handsome model by E.J.R. and a matching CRM cover from October 1944.



Neville Duke and Eddie Riding in the Hawker Tomtit G-AFTA.



Sqn Ldr Peter Hunt and E.J.R. prepare the Vickers Viking for one of its many RTP flights.



E.J.R. with the twin engined RTP Short Sunderland in the late 1940's. We may think that indoor flying has advanced with the advent of Micro RC, but who today is flying indoors off water?



From left, E.J.R., Norman Eastaff and George A. Cull (George also worked at AeroModeller). The aircraft providing the backdrop is the Piper Cub (G-AKAA) that E.J.R. regularly flew from Eaton Bray.

displays were organised in the truest 1930s barnstorming tradition. There were aerial paper chases (using toilet rolls), parachute drops and flour bombing of an old Austin Seven driven by a couple of dubious characters.

At the June 1949 event legendary Hawker test pilot Neville Duke flew Hawker Tomtit G-AFTA in a 'dogfight' against a Tiger Moth, flown 'solo' by fellow Hawker test pilot E. S. 'Doc' Morrell. As the climax to this Great War parody Morrell was 'shot down' and the pilot seen to bail out. The 3,000-strong crowd went into a horrified hush as the 'pilotless' Tiger dived towards the horizon and disappeared. It was; however, under full control for it was not Morrell who had bailed out, but Major 'Dumbo' Willans, who had remained hidden during the flight, unseen until exiting the aircraft.

An interesting postscript to all this occurred many years later when I was editor of *Aeroplane Monthly* and met Neville Duke for the first time. I asked him if he remembered giving E.J.R. a trip in the Tomtit at Eaton Bray. "I certainly do," he replied, "but it was your father who flew me." Neville later sent me photographs of the occasion, accompanied by a letter saying how much he had enjoyed the Eaton Bray meetings. It was a gesture that was so typical of that great man.

National Model Aircraft Exhibition

How many readers remember the National

Model Aircraft Exhibition organised by the Daily Express in association with AM and held 1945-47? First held at Dorland Hall in Lower Regent Street, London, and opened officially by Lord Brabazon of Tara, Britain's Pilot No 1, this event became a major attraction in the aeromodeller's calendar. E.J.R. was involved with at least two of these events. In 1946 he was to be seen in gum boots helping Sqn Ldr Peter Hunt of the Eaton Bray Research Department with the Round-The-Pole (RTP) Dorland Floatplane, originally a rubber duration design. This was one of several electric (RTP) models, others being a D.H. Vampire 'real air jet' and a beautifully made Vickers Viking, reported to have covered thousands of miles before it was retired in 1947.

For the final Dorland Hall exhibition E.J.R. built a twin-engine model based on the Short Sunderland. I particularly remember this model because I was given the fuselage as a Christmas present. RTP flying was the nearest E.J.R. got to flying control line models, an aspect of aeromodelling that he hated with a vengeance; he was once quoted as saying that if you bolted an engine to a house brick it would 'fly' just as well as any control line model. Now that I would love to see!

A Life Cut short...

E.J.R.'s idyllic but far too short life ended one Easter, on Good Friday, 7 April 1950. He and Stanley Orton Bradshaw had flown from Elstree to report on the opening of the

Boston Aero Club in Lincolnshire. After taking off for the return flight Bradshaw decided to show off the Auster Autocar's slow flying ability. Heading into a strong wind and with a ground speed of less than 10 mph, the aircraft stalled and spun in just outside the aerodrome perimeter. All three occupants died instantly. With the demise of E.J.R., both model and full-sized aviation lost a multitalented enthusiast. Ironically, the aircraft in which he was flying, G-AJYM, was the last subject of his *Aircraft Described* series that he was to see in print.

To mark the 50th anniversary of his death in 2000, another model aircraft publication published a tribute to E.J.R. I was very touched by the penultimate paragraph: 'We have one further reason to be thankful for Eddie Riding as, together with his wife [Marjorie], he was responsible for producing *Richard Riding*, for many years [25] Editor of *Aeroplane Monthly*. Richard, or Dicky as he was then known [and is still], was only eight [just] when his father had the fatal accident, but he was already an aeroplane fanatic. That love of aircraft and aeromodelling has never left Richard, a tribute to the encouragement given to him by a quite extraordinary father'.

Readers who want to know more about E.J. 'Eddie' Ridings photographic coverage of aviation in the 1930s should obtain a copy of Richard Riding's book 'A Flying Life' ISBN 978-1-78155-087-8. ●

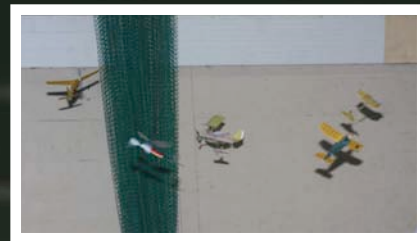
IMPINGTON INDOOR EXTRAVAGANZA

Plenty of serious indoor flying and some fun in the air and on the ground at IVCMAC on Sunday 1st November is covered by Andrew Boddington.

Typically twice a year the Impington Village College model club (IVCMAC) just north of Cambridge, run an indoor event open to non-club members. They have use of the 100 x 50 x 28 foot main sports hall for indoor free flight sports, scale and indoor duration

models, and a separate smaller hall for RC and RTP (Round The Pole). Sadly, the talk which was to have been given this day by Clive King on building and trimming his INDIGO design (Free Plan November AeroModeller 942) did not take place, as Clive succumbed to cancer and died just a few days before the event (Clive's obituary

was in the last issue). Clive was remembered by Chris Strachan before a replacement presentation was given by another IVCMAC member, Michael Marshall, on his approach to vintage and modern Coupe d'Hiver competitions, including techniques and materials used. The audience of over 30 were entertained and engaged by his



With plenty of participants the mass launch makes a fitting finale to the day.

informative talk, with plenty of example airframes and gadgets being passed around.

With around 100 attendees there was always something happening, but it never seemed so packed that one couldn't fly. Kevin Wallace and SAMS Models were in attendance to help keep everyone flying. Low key competitions were run in the large hall for Bostonians, the Ray Malmstrom designed Viking (AeroModeller 941 Free Plan in October) and of course the Rubber Powered car drag races.

The Rubber Powered car competition calls for a straight tracking car which can cope with the change of torque as the motor runs down. This year's race was won by son and father, Andre and Peter Bird with their comparatively large gold-finished car.

IVCMAC made best use of the space they had for the day, by using the room between the main hall and the smaller flying hall for a static exhibition of a diverse range of FF, CL and RC models that showed the aeromodeller's craft at its best. Once in the other hall it was great to see a large number of RTP models lined up waiting to use the RTP rig. The growth of RTF RC indoor models has perhaps eclipsed RTP electric powered flying, but there were plenty of people with sport and scale models to show that this is still a great way to have fun flying during the winter months. Also present was Phil Glover of The RTP Hut (www.rtphut.co.uk) who has taken over from Ballard's and Harry Butler as a specialist RTP supplier.

Thanks to all the members of IVCMAC who made the event such an enjoyable experience. Do make sure the date of the next open indoor event is in your diary for 20th March 2016, and for more information go to their new website at www.impmac.co.uk ●



The static exhibition of flying models made for an absorbing diversion.



RTP attracted a variety of scale flying models. It is a great way to fly interesting types such as multi engine aircraft or ducted fan jets in a small space indoors.



Michael Marshall gave the talk about his approach to outdoor duration flying and the techniques and materials he uses in Coupe d'Hiver. The red model is his Italian design Lo Zigolo vintage C d'H.



Jim Crossley and Andre Bird with their Bill Dean designed KK Elfs. Jim managed to win a bottle of wine for his dad Richard by landing closest to the bottle, and more importantly for him some sweets for his Bostonian flights.



There were plenty of Malmstrom Vikings flying around in their spiritual home.

F2B CL AEROBATICS CHAMPION OF CHAMPIONS COMPETITION

Probably the most talented group of F2B flyers ever seen in the UK travelled from across Europe to compete for big cash prizes at this prestigious North London event. Paul Winter reports on an event that he put together on his own initiative.

Britain has always been very involved in F2B aerobatics, but regrettably in recent years we've failed to produce a champion, or anything even resembling a champion. Worse, we have more often than not failed to get in the top twenty at any major European competition. How can this be you must be wondering. Well the reasons are many and varied, but first I guess has to be the UK weather, when it's half decent and we would like to practice we are all busy working, but come the weekend the wind starts to howl. Then we have to face the fact that the majority of our F2B flyers are too old, a hard pill to swallow admittedly, but it's true. And notwithstanding the best efforts of many of these seniors it's proved impossible to attract youngsters into the hobby/sport; unless it has a screen and keyboard they are just not interested. Finally, we seem to be stuck in a time warp regarding our model construction techniques. Balsa, tissue and dope still seem to be our materials of choice, yet the world has moved

on and now embraces composites which produce amazing models.

So how come these Europeans, and particularly those from former Russian satellite countries, are so successful? Most of their top flyers take model construction and technology very seriously, to the extent that they have developed pre-formed wing and fuselage moulds that are then wrapped with impregnated fibreglass cloth to provide surfaces with amazing strength and rigidity, and best of all, significant weight savings.

Probably the most successful in this field are the Yatsenko brothers, Yuriy and Andrey from the Ukraine. They have developed a business selling their models, with the 'Gee Bee' and 'Shark' being popular examples.

www.discovery-aeromodels.com

But what has all this to do with the competition at Barnet in North London you must be wondering? Well since the days of the World Champs held at Woodvale, Liverpool in 1978, when it rained almost every day (surprise, surprise!), it has been my dream to hold a meeting of similar stature in the south. My reasons

were two-fold: firstly to attract the best talent from across the world, and secondly to give UK flyers the opportunity to watch how the control line F2B schedule should be flown.

But this was not to be an 'open to all' competition, you had to qualify by being either a current or former World, European or National champion. Hence the title of the event - Champion of Champions.

But how was I going to attract this talent? Suddenly I had an amazing stroke of luck, one of my business contacts stepped forward and said he would sponsor the event to the extent of £1000 for the first place flyer and £50 to all the other participants down to 10th place. Needless to say I gratefully accepted the offer with open arms.

Detailed Preparation

Now I could start planning. I am fortunate to have the use of a large sports ground on the outskirts of Barnet in North London, and after discussions with the owners a deal was struck for exclusive use for the second week (6th-9th) October

2015. A website was created (www.championofchampions.org.uk) giving all the details, printed flyers were distributed at all the European competitions I attended. Then it was just a question of sitting back and waiting. Initially I was not disappointed, the usual talent from Europe made commitments including Igor Berger, the current F2B European Champion, and two flyers from the USA. Unfortunately, as we got nearer to the competition the two Americans dropped out as did Igor Berger because of family health issues. None-the-less I was still left with a pretty amazing entry of 9 top flyers from across Europe plus 5 of the top Brits, 14 in total.

Next question was the development of the infrastructure and format. Many onlookers watching a competition think it all happens by magic - Oh, if only this were true. Firstly you need judges, five in my case, which is more than would be available in the UK, so my net had to be cast wider. To cut a long story short, after much negotiating three came from across the sea and two from the UK. But they

All the participants at the Champion of Champions Competition.





Lauri Malila from Switzerland prepares his model for a flight.



Yuriy Yatsenko assembles his model in the clubhouse.



Aeromodellers can do genteel! Afternoon tea at the 'Doll's House'.



Andrey Yatsenko (right) receiving the fabulous wooden first place trophy from designer and maker Melvyn Esterman (left), and organiser Paul Winter.

all needed accommodation so a block booking had to be made a local hotel. Scoring is an important function at any contest and competitors expect score printouts within minutes of their flight, so a caravan with power was arranged together with two very experienced scorers (and computer operators!). Finally a circle flying co-ordinator or 'pit boss' was needed and I'm grateful to Mike Crossman (a current FAI jury member) for taking on this challenging role. And there was you thinking it all ran itself!

As to the format of the meeting I wanted to give each flyer the maximum number flights possible, as after all many had travelled long distances and made a big financial commitment. It was therefore decided to run two rounds on each of the three days of the comp, with the best four scores from six counting for final positions. This system is almost foolproof as it means that a flyer is not committed to fly on all three days,

just two to be in with a chance. Better still, if the weather turns sour on one particular day then they can fall back on the other two.

Chocks Away!

So things got underway on Tuesday with flyers practising in every available circle. Wednesday was the first comp day and as you would expect in the UK there was light rain and a moderate wind. However, after a vote it was decided to carry on. Thursday and Friday saw a U turn in conditions with light winds and wall to wall sunshine the order of the day. Stunt heaven for sure!

But what of the actual flying? From the word go it became obvious that the two Yatsenko brothers were going to be at the top of the scoreboard, it was just a question of which one. The flying from both of them was a sight to behold and exactly to the rule book - rock solid level flight at 1.5m, square turns that took your breath away and manoeuvres

overlaid almost to the nearest centimetre. Amazing stuff!

And what about motive power? The Yatsenko's favoured IC as did some of the other European flyers, but the Brits with just one exception opted for electric power. As for models, not everyone had a Yatsenko as many still favoured the built-up traditional balsa models.

But a meeting of this nature is not all about model flying, there's a social side as well. So Tuesday evening saw a large gathering at the local pub for some traditional English fare. On Wednesday we all went to a speciality fish and chip restaurant, a proper sit down affair attended by about 25 or so competitors and their partners. In between times we managed a visit to Hendon air museum followed by English afternoon tea at a very olde-worlde teashop called the Doll's House in Harrow on the Hill. Thursday was the piece de resistance when we had a superb banquet at the

flying field clubhouse.

Results

Friday saw the comp back in full swing as this was the last chance to impress the judges. The Yatsenko's were again on form and in the final analysis Andrey came out in top spot just above his brother Yuriy by 13 points. Alexandra Gauthier from France came in at third. The best of the Brits was the 8th place of Roy Cherry. There were no incidents or crashes throughout the meeting, but one flyer did suffer from 'comp nerves' when he forgot two of his manoeuvres - hardly surprising when you are performing in front of five eagle-eyed judges!

Come Friday evening and it was time to say all the goodbyes with many of the Europeans facing long journeys home. Without exception everyone said that this was the best meeting they had ever attended, and the question on their lips was when the next one was going to be held. Hmm... ●

www.aero



NEVER MISS AN ISSUE
SUBSCRIBE TODAY!

www.adhpublishing.com

From
£5.55

Next issue will be out on February 18th - get your copy delivered to your doorstep before it reaches the newsagents by subscribing



www.adhpublishing.com



01525 222573



enquiries@adhpublishing.com



JOIN THE ELECTRONIC REVOLUTION

Enjoy Aeromodeller on your iPhone, iPad, Android phone or tablet PC.

Visit the App Store or Google Play and search for "Aeromodeller" or visit PocketMags.com to purchase single issues and subscriptions to read on your device or PC.



Google play



Available on the iPhone

App Store

modeller.com



Follow us on Facebook

<https://www.facebook.com/pages/Aero-Modeller/328939897226034>

Follow us on Twitter

@AeroModellerMag



- FREE FLIGHT
- CONTROL LINE
- VINTAGE
- REVIEWS
- FREE PLANS

- CONSTRUCTION
- TECHNIQUE
- REPORTS
- ART
- HOW TO'S

- GADGETS
- INDOOR
- TECHNOLOGY
- HISTORY
- SCRATCH BUILD



**ALSO
AVAILABLE
FROM ADH
PUBLISHING...**



SUBSCRIBE FOR ONLY

£42



SUBSCRIBE FOR ONLY

£44



SUBSCRIBE FOR ONLY

£44

SEE THE ADH
WEBSITE FOR MORE...

Part 20

Better... than a Skip?

John O'Donnell ponders what to do with a lifetime's collection of modelling paraphernalia and asks whether a National Resource Centre needs to be co-located with a flying site?

Having a Resource Centre is a natural enough concept for the routine operation of a National Body such as our BMFA. Not only is there the need for the co-ordination of the current scene with all its associated activity and arrangements, but there are normally records and history going back over many years.

Some of the background material (on the BMFA and its forerunner the SAME) is already in the hands of the Association and presumably stored in or near the current BMFA office. Much more of our history is

in private hands - particularly in individual collections based on a particular theme.

In the last few years there has been recognition of this situation together with suggestions that the BMFA should have its own Centre embracing all aspects of our activities. Such a facility would include not only present-day administration matters, but also a library, paper and other archives, significant memorabilia and even a display hall.

Unfortunately this project has become combined with the idea of finding and purchasing a site for a National Flying

Field. Whilst of obvious appeal, especially to those hoping it would be in their own neighbourhood, the practicalities do not seem to have been adequately examined. Although the chances of obtaining such a field are very low they have diverted interest and effort away from considering a Heritage Central or even a bigger Office.

There are, of course, those who consider collections as a waste of time, effort and space. You may think that 'History is bunk' but there is much that can be learnt from mistakes that do not need to be repeated. But it has to be available before it can be accessed.

Do we need a purpose built Resource Centre when ready built quality offices are available? This is in the wrong place (within a few miles of where I live in Wigan) but similar places must exist near many towns.



BMFA publicity shot of Architect's Dream for the National Centre – but does it need to be near a National Flying Site?



A Skip... the very place where Frank Monts' CdH might possibly end up! The model was sent from America for me to fly it proxy in the 1968 Anglo-French CdH International. In subsequent years this model did well including winning the 80 gram class twice. Later both the FAI and the BMFA discontinued the allowing of proxy flying and that of requiring BoM. This means that I can no longer fly the model for its builder but I could fly it for myself! This is academic as I now have better models of my own - Plus the model being too 'new' for even the SAM Vintage CdH cutoff date. Is this a significant model worth preserving? Or would YOU like to have it?

Planning what and how to leave for the future could be a wise investment.

Requirements

Saving material for posterity needs planning and preparation. To set up a venture including a library and museum demands commitment, energy and enthusiasm not to mention a suitable building. It definitely needs someone who is whole-heartedly behind the project and appreciates what facilities will be required, particularly as regards space. Finance is an obviously important factor both initially and for subsequent maintenance.

In the present situation the only immediate move towards preserving and storing archive material is likely to come from private or commercial support. This could well be complementary to a possible BMFA facility by (at least) providing a safe 'back-up'. The interest in such a venture needs to be long-term and hence based on a club, group or some other organised body. An individual, however strongly motivated, may run out of time. Finding a successor would not be easy.

If such were established then it might develop into the basis for a truly National Resource Centre. This of course would depend on the co-operation of other

collectors and the BMFA itself. This sequence could be reversed if the BMFA were to take the initiative.

I am not the only person with a substantial library. There are other people with their own library or collection. Moreover it is not just the printed page that needs consideration. There are collectors of plans (often converted to digital format) plus kits, engines and other ephemera.

The preservation of 'significant' models is inevitably suggested but introduces more requirements - starting with storage and display space. It needs to be remembered that early models were often large and cumbersome - and that some later ones are no different. Models are still evolving (think electric) so recent examples will also need consideration. It is surely relevant to mention that the BMFA already has a collection of models - that of the late Alwyn Greenhalgh now in the custody of Tim Westcott. Its present state and extent is unknown to me but it should contain some interesting models - some of them provided by my family.

My present position is straightforward enough. Over a lifetime involved with model aircraft I have accumulated not only a library, but also a very considerable quantity

of associated paraphernalia mostly, but not exclusively, with free-flight connections. Since the years are passing it seems prudent to consider what should be done with all this.

Motivation

Having seen instances where a deceased modeller's effects have been 'thrown away' by relatives or executors I wish to avoid causing a repetition. Another scenario is that of arranging a 'garage sale' and inviting local friends or club-members to attend and buy (or just take-away) what they fancy. This will certainly reduce the volume of material and even raise some money. However the buyers will be selective - taking what is valuable, collectable or otherwise desirable. Disposing of the rest can be a real problem.

Frequently the main concern of the modeller's family is not sentimental or financial but a desire for the space provided by clearing the room used as a workshop. When going to inspect and buy some back-issue magazines I have been asked more than once whether I would take 'everything' and give something for it all. Some of these extras are with me still.

In the course of filling gaps in my own magazine collection I inevitably extended my list of titles. Even after selling off my duplicates and unwanted copies I still have a very extensive collection of aviation and modelling literature. This has been invaluable over the years especially when I needed to check facts (or confirm references) when writing an article.

Action

This situation has made me realise what a useful and comprehensive reference tool is in my possession. My library should be just as valuable to anyone else involved in



Memorabilia for possible display. Includes JO'D's Championship plaques mounted in Perspex courtesy of Laurie Barr.



More memorabilia from Club rallies. Finlux was a generous sponsor of many Northern Area Club contests. Many modellers must have collections like this.

researching or describing the background and history of the model aeroplane. If it were decided to break-up and disperse my

collection it would be missing a golden opportunity to make this material more widely available.

Merely offering all this material to an existing aviation museum is not a good, though obvious, idea. Such establishments



'Significant' model already part of the Greenhalgh collection. Hugh O'Donnell's Wakefield being proxy-flown by Cliff Montplaisir in the 1954 Finals. Model also flown by HO'D in following two Championships.

tend to become exhibitions rather than an accessible archive that would be useful for research. Providing them with quantities of literature is unlikely to be beneficial or appreciated even if they accept them.

I have enough material to start a library plus an archive. What is needed is a suitable custodian to take it over, then organise and catalogue it. After this it should be available for reference by other enthusiasts and collectors. This implies time, space and upkeep - not to mention a certain amount of money. Whilst the BMFA should at least be interested it appears to have other priorities at present.

There are other people who have their own specialist collections. Photographs, plans, kits, even engines come to mind. Including some of these would make for a wide and comprehensive archive. The actual exhibits are unlikely to be a major problem - but sorting, cataloguing, not to forget 'pruning' and maintenance, might well be a different matter. Aeromodelling did not suddenly end in the 1950's and has diversified into Control Line and Radio Control activities which can hardly be ignored.

My Offer

If there is anyone (or any group) who wishes to own and operate such a Resource on a long

term basis then he only needs to convince me that he has the vision as well as the means and ability. If he can manage to do this then I am happy to donate (and I use the word deliberately) more than enough to start him off. I would emphasise that mere storage is only a starting point. After all the whole concept is essentially a long-term affair.

Apart from acquiring sufficient space (think in terms of a fair-sized house rather than a small box-room) the biggest problem will be finding the initial founder and sponsor. If this is solved then we should be able to emulate what the Americans have accomplished at Muncie.

I have long and essentially complete runs of relevant British and American magazines plus many sets of other publications. These are biased towards model aircraft although there is much full-size material as well.

This offer is not entirely philanthropic. If it were accepted it would solve my personal situation in one fell swoop. Need I say that my wife and family would be delighted?

Ts & Cs

My offer of donating my library holds for both home and abroad. Real interest from the BMFA would be the best possible response. What I do not want are requests from individuals who are only asking for odd

John O'Donnell Library - Partial list of contents

Monthly Magazines (many as bound volumes)

The obvious British and American titles mostly as long complete runs. From the mid 1940's onwards.

Various club, private and subscription newsletters.

Other Publications

Aeromodeller Annuals, Frank Zaic books, SAM35 books

NFFS and FFF reports

Aeroplane Spotter, Profiles and other full-size publications.

Encyclopaedia of Aircraft

rarities to fill gaps in their private collections.

There is a partial list given below, and some further indication as to what I have available can be supplied to those seriously interested.

You can contact me by email john@odonnell3737.co.uk or 01942 211742. ●



The space required to run a National Resource Centre shouldn't be underestimated. These blue bound books are just the AeroModellers from the 20th Century at the National Aerospace Library in Farnborough.



The Solent Sky Museum has an excellent mock-up of a traditional Model Shop window, but their main focus is full size aviation in the Southampton area.



RAFMAA

The Royal Air Force Model Aircraft Association

At the 2015 Old Warden Scale Weekend I first met Colin, Jordan and Josh Pearce and noticed they were all resplendent in RAFMAA T-shirts. I was intrigued to know more about the RAFMAA, particularly given the difficulties we all face finding suitable large flying sites, and with the help of James Goodright the RAFMAA PRO, Neil Tricker has put together the following – the Editor.

NEIL TRICKER (AKA 'Electricks') joined the RAFMAA in 1975 and has flown most classes of model with the exception of jets and helicopter (never trust a model you can't test glide). He's not a fan of ARTF preferring to design and build his own, with several designs kitted and currently on the market.

The Royal Air Force Model Aircraft Association (RAFMAA) was formed in the late 1940's with the aim of promoting the ideals of air mindedness, innovation and participation through the medium of model

aircraft operation and construction. To this end the building and flying of model aircraft was classed within the Services as an authorised sport and as such attracted a small level of public funding. Whilst sadly these days are long gone, the spirit and intention of the association is still alive and kicking with a relatively healthy level of membership.

From its inception until the late 1990's the RAFMAA was a separately run modelling association with its own insurance which was recognised and accepted by the British Model Flying Association (BMFA). Following discussion between the BMFA and the

RAFMAA it was thought that it would be mutually beneficial if the RAFMAA came fully under the BMFA umbrella which resulted in the formation and inclusion of Area 14 RAFMAA within the BMFA fold. This is a somewhat unusual set up when compared to the other BMFA Areas in that whilst the normal Areas (Midlands, North West etc.) are made up of all the various clubs in their area, Area 14 RAFMAA is a large single club covering an area bounded by the Gulf, Falkland Islands or just about anywhere serving members are employed, with clubs being formed and run on most RAF stations. In 2014 the RAFMAA laid on day and night public flying displays on Ascension Island in the South Atlantic Ocean. Whilst there, one of our members attained his fixed wing A certificate in what must surely be the BMFA's most southerly Achievement Scheme award to date.

Multi Discipline

This far ranging approach has some distinct advantages in that we do not have single discipline clubs, with all the mainstream modelling disciplines being undertaken within the station club. With a few notable exceptions the majority of our longer served members are capable of flying Control Line, Free Flight and RC; admittedly not always with the same degree of competence, but capable nevertheless. This is reflected in the style of our organised events where throughout the year RAFMAA members meet up and partake in different aspects of the modelling spectrum. In the past these gathering were of a competitive nature covering all classes of model flying culminating in the annual Main Championships where some serious silverware was distributed. Unfortunately the RAFMAA is not immune to the decline of competitive flying that is being experienced throughout the modelling world. This decline has resulted in most of our recent events



Seen at the Barton Bash in 2015 is (right) article author Neil Tricker about to prepare the Barker/Tricker classic 15 Timeta, while Mark Greenwood looks happy to be mechanic for Ed Needham! (Photo from Malcolm Ross)



RAFMAA member Paul Blakeboroughs' traditional scratch built RC scale model of a lesser known Waco YKC used by the Long Range Desert Group in North Africa in WWII.



Neil Tricker's RC Assist Bulldozer has 1 channel radio with electronics by P Luby. Photo taken at the now lost to model flying RAF Church Fenton on one of the legendary summer evening fly-ins.



Latest RC Assist model by Paul Blakeborough, a modified G.E. Cabinette (Frank Ehling 1942). Model uses a Redfin 030 for power.



Paul Blakeboroughs' FF Pfalz D.IIIa finished in tissue and painted in Hptn Rudolf Bertholds scheme with Vallejo Model Color. The model was converted from the DPCM rubber kit to Gasparin CO2.

being run as informal 'Fun Fly' events rather than ordered competitive events.

In a similar vein the majority of our members have been quick to embrace the availability of ARTFs and the associated technology. However, whilst I am glad to report that the old skills still survive, I am concerned for the future once the 'old and bold' craftsmen amongst us move on. With this in mind the RAFMAA has commenced a small scale programme of mass build and one design competitions. This has to date produced a small level of interest and hopefully it will expand to other designs. One area which is enjoying popularity is the recent addition of Quad-Copter Racing to the agenda of events held at the annual Main Championships. This of course is totally in keeping with the ethos of the RAFMAA when you consider the average age and technical ability of some of our highly skilled tradesmen.

Common Cause

The Service ethos is also well illustrated within the BMFA with several RAFMAA members holding committee positions

serving both the BMFA full council and associated technical committees. These members give freely of their time providing valuable assistance and liaison between the Society and the Defence Infrastructure Organisation (DIO) in the matter of access to MOD facilities. The matter of access to MOD sites, particularly airfields, is becoming increasingly difficult mainly due to closure and subsequent sale of surplus land from the MOD estate. A state of affairs which is equally restricting upon both the BMFA and the RAFMAA. Therefore the RAFMAA is a keen supporter of the aims of the BMFA to acquire and run a site dedicated to model aircraft flying.

Throughout the year the RAFMAA organises and runs various Warbird and Jet events which are greatly appreciated by the members of the BMFA, particularly the 'jet jockeys' who have been known to go weak at the knees when confronted by acres of tarmac. Even with the shrinking numbers of the RAF the RAFMAA still strives to maintain a presence in the Model Competition world with several individuals and teams competing at International and World Championship

level - details can be found in the news thread of the RAFMAA web site.

With all this history behind the RAFMAA (Frank Whittle was a RAF modeller) where do we see ourselves in the coming years? Hopefully the Association will gain members and strength and continue along the path of modelling excellence. And with the speed of electronic development what is the future of aeromodelling? Hopefully some years in the future there will still exist those amongst us who partake in the conversion of basic elements into an elegant creation capable of flight in the manner of that famous poem, Oh! I have slipped the surly bonds of earth...

You can find more about the RAFMAA at www.raf.mod.uk/rafmaa/

On the site you will see there are various levels of RAFMAA membership available, ranging from Full for current Service Personnel, to Associate for Ex-Service Personnel through to Affiliate for non-Service Personnel who are members of a recognised civilian club. There is also a subs calculator you can download. ●

GILDING'S MODEL AERO ENGINES AUCTION

Sales of engines, kits and other modelling items at this specialist auction are covered by Andrew Boddington.

Despite an auction pitting one bidder against another, the annual Gilding's of Market Harborough model engine sale in November is a friendly affair, a chance for aeromodellers to meet up when there are fewer outdoor activities. Given this is typically a sale of a lifetime's acquisition, often from the estates of deceased modellers, there are many vintage enthusiasts (SAM 35 and 1066) in the room to fill gaps in their collections. And yes, many are vintage themselves, but it was good to sit next to a young teenager who was enthusiastically bidding with his father on some early kits of flying models.

Each year I attend this auction I wonder

whether the bottom will have dropped out of the market for used engines which are no longer in production, given there are fewer manufacturers of new engines around today. By my estimation this is far from the case, with a healthy crowd of over 100 in the room, and others bidding by phone and online. New in box and rare diesel engines continue to attract high prices, but useable everyday glow engines can be had for an affordable price.

New this year was live internet bidding where the lots are shown on screen with an aural feed of the proceedings to the distant bidder. There was an additional 3% premium for anybody bidding and paying this way as the online service is provided by a third party. It did have the added advantage of showing

a photo of the lot on a big screen to the audience in the room, but I missed the Dick and Toby show from previous years when they displayed each lot in turn!

The auctioneers must be singled out for the professionalism of their craft; not only do they keep their eye roving the room for new bids, but they now have to track online activity to make sure the best price is obtained for the seller. Gilding's has succeeded where other auctioneers have failed by working with knowledgeable people when compiling the sale, and learning enough about model engines over nearly 20 years to keep the process fair, smooth and fast moving.

So how would I characterise this latest auction? There was a higher proportion of

